10" TABLESAW BLADES See the best in our test *See page 62*

Better Homes and Gardens

WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

ISSUE 121 FEBRUARY 2000

Make this heirloom

ROCKING CHAIR

Our jigs guarantee your success

See page 53

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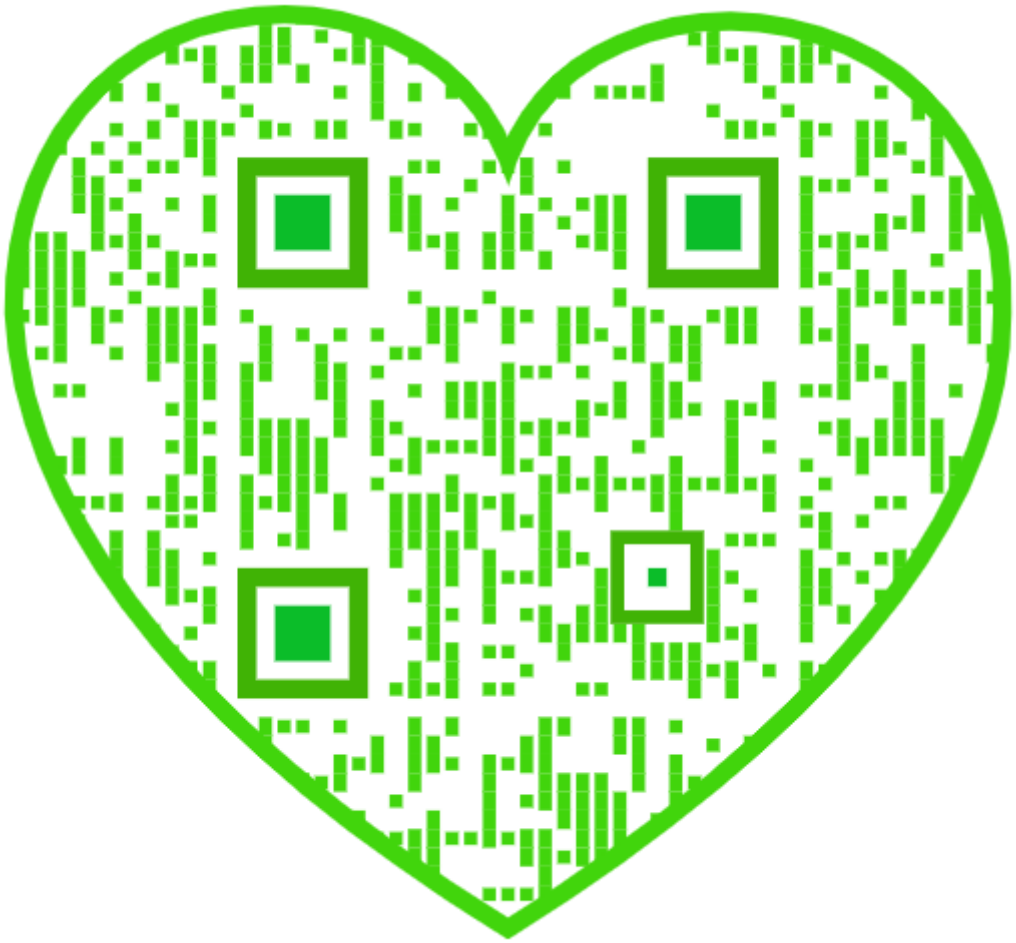

ISSUE NO. 121 FEBRUARY 2000
This issue's cover wood grain: chacte

Better Homes and Gardens® WOOD

THE WORLD'S LEADING WOODWORKING MAGAZINE

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Cover photograph: Hetherington Photography

My First Experience as a Chairmaker

It doesn't happen often. But I was mesmerized immediately by that charming child's rocking chair I spotted at Remember When Antiques, a dimly lit shop on Bay Street in Savannah, Georgia, more than two years ago. And I knew that we just had to do something with it. That something is on the cover of this issue.

You wouldn't think a guy like me could fit into the child's rocker we used as the inspiration for our rocker design, would you? Guess what? I didn't even get stuck.

The road leading to what now is a full-sized rocking chair has been a long, winding one. But I think you'll agree that we've created something beautiful here. And you can, too.

For better or worse, in my zeal, I volunteered to build the chair. And to make absolutely sure this project came out just right, I engaged the assistance of Jim Downing, *WOOD* magazine's Senior Design Editor. As it turned out, determining the angle at which to drill all of the spindle holes was the most challenging part of the project. It took three full-sized models to finally settle on the perfect angles.

With that out of the way, we needed a surefire way to drill the holes accurately. To do this, Jim came up with the perfect solution: an angle-drilling jig for your drill press. You will find it explained on *page 60*. Finding good-quality walnut was difficult, too. I'll bet I looked through 300 or more boards to find the ones I wanted to use. We've lined up a source if you have trouble finding what you need. And for those of you who don't have a lathe, or just don't feel like turning the 13 spindles needed, we've provided a mail-order source for those parts as well.

Now that we've completed this wonderful-looking project, Jim and I think it was well worth the time and effort everyone put in on it. And do you know the best part? I can honestly say that if you work carefully, you won't have any trouble constructing this beauty.

By the way, I'd like to see a snapshot of your handiwork after you get done with your rocker. If you share that with me, I'll send you a brass plate bearing the inscription "A custom-built *WOOD* magazine Family-Heirloom project" as a reward for your dedication. That will be free of charge, of course. Send your snapshot to I Built a Rocker, *WOOD* magazine, 1716 Locust, GA310, Des Moines, IA 50309-3023.

Happy building!

Larry Clayton

Jim Downing verifies the hole angles for the seat-back spindles and back splats. With this project, angles are everything.

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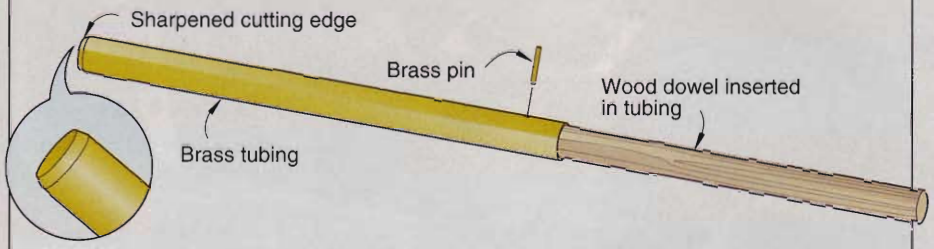
TALKING BACK

Neat, clean holes with sharpened brass tubing

In issue #116's "ASK WOOD," a reader wanted tips on drilling holes in model aircraft built of balsa wood. For my decoy carvings that need eye holes, I simply buy a short length of brass tubing in the appropriate diameter at a hobby store. Then, I fasten it to a dowel handle with a brass pin and sharpen the protruding end—the cutting edge—with emery cloth. Thin-wall tubing sharpened to a razor edge like this will cut neat eye holes with no crushed fibers. But, remember to rotate the cutter as you push it in.

—W. H. Brown, Niagara-on-the-lake, Ont.



For long-lasting brushes, oil them up

Regarding the advice about keeping your natural-bristle brushes soft, as mentioned in issue #117's "ASK WOOD," I have been a sign painter for the better part of 50 years, and learned long ago how to preserve my $25 to $50 brushes after use with oil-based paint or finish.

I rinse off excess paint, shake out excess thinner, then swish the brush in lard oil or a heavy mineral oil. With my fingers, I smooth out the bristles, and store the brush in a brush box or drawer. Before I use the brush again, I rinse it out with paint thinner.

—Jack Ekker, Marysvale, Utah

Don't plug in turned-on tools

In "Where Safety Begins" in issue #115, the author states that you can check to see if you have magnetic switches by turning on woodworking machines, unplugging them, then plugging them back in. But you should never unplug a machine when it's running. And you should never plug in any electrical tool or appliance while its switch is on. Doing so may cause an electrical arc that can be potentially lethal, unless the machine really does have a magnetic switch.

—Steve Aga, Colorado Springs, Colo.

Thanks for making your point, Steve. "Where Safety Begins" is written by safety expert Mike Gililland, who basically agrees with you. However, the part of the article you mention was from a woodworking professional's contribution to the WOOD ONLINE® *discussion group, and was not included in Mike's original copy. It should have been checked out.*

We would like to hear from you

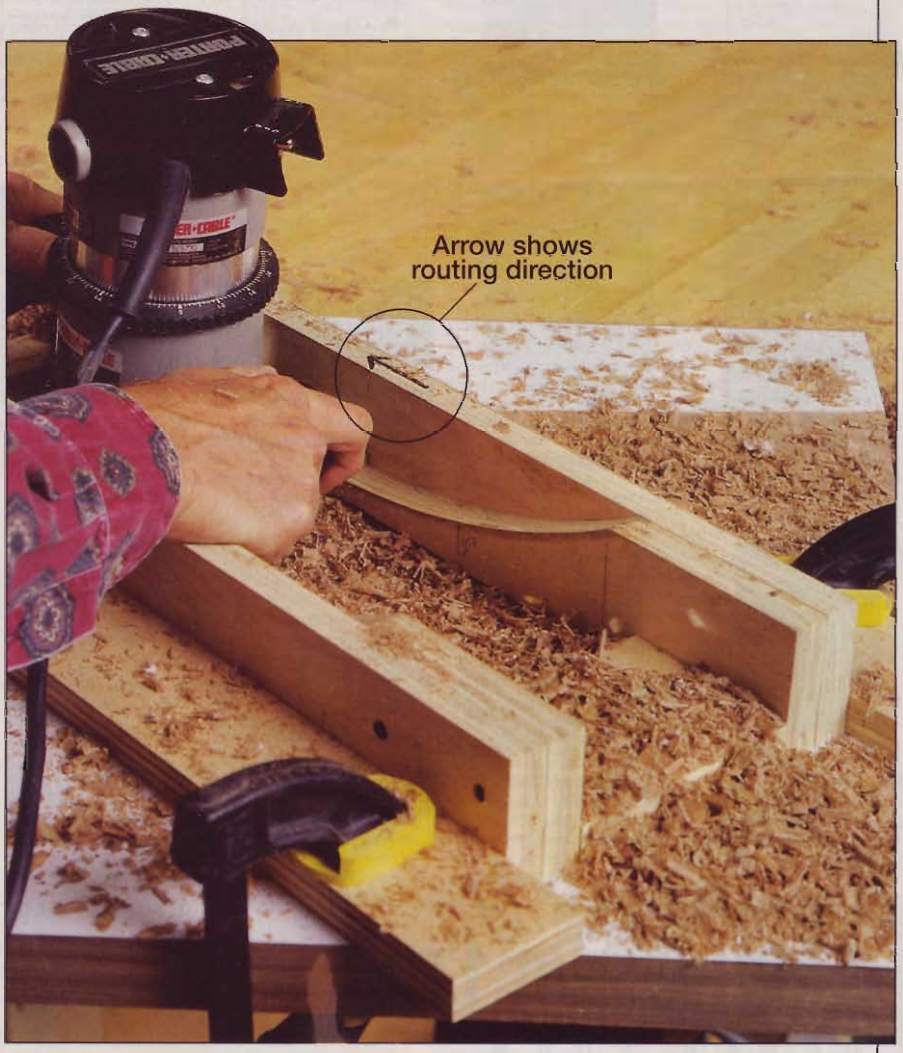
We welcome your comments, criticisms, suggestions, and yes, even compliments. We'll publish letters of the greatest benefit to our readers. Write to: Talking Back, *WOOD* Magazine, 1716 Locust St., GA310, Des Moines, IA 50309-3023

Here's The Scoop On ROUTING A CHAIR SEAT

This router jig makes scooped seats simple

A seat scooped out of a solid plank, a defining feature of the Windsor chair, first appeared more than 250 years ago. Hollowing out the seat then was a job for an adze and inshave. You can still form a seat that way today—and many chairmakers do.

But when we built the rocking chair on ***page 53***, we decided to take a modern approach by routing the seat. Here's how to build and use our jig, shown in the photo at *right*, to make a scooped-out seat for your rocker—or any other chair constructed in the Windsor manner.



Build a simple router jig to start

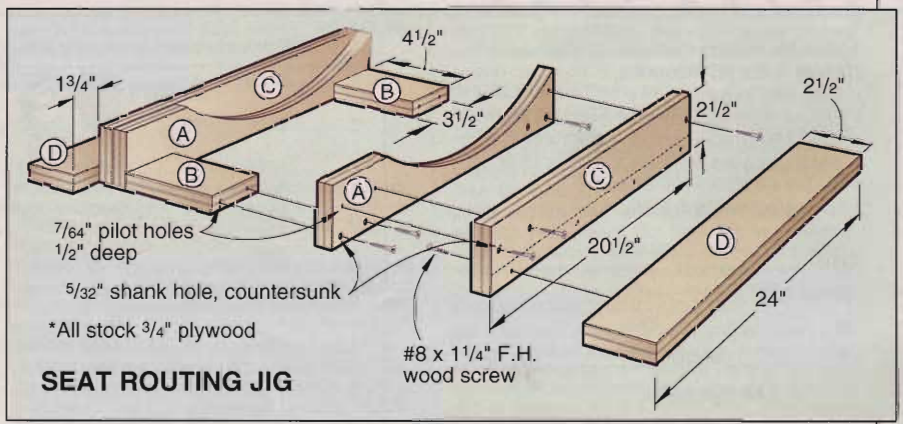
Refer to the Seat Routing Jig drawing, *below right,* and the Guide Rail Full-Size Pattern in the *WOOD PATTERNS®* insert. Then cut the parts for the routing jig to size.

Temporarily laminate blanks for the two guide rails (A) with double-faced tape, and apply the Full-Size Guide Rail Pattern to the stack. Bandsaw the curve, taking care to make a smooth, continuous arc. Sand the curved edge, and separate the parts.

Assemble the jig, referring to the Seat Routing Jig drawing. First join the two guide rails (A) with the spacers (B). Then fasten the sides (C) to the clamping wings (D). Finally, attach the C/D assemblies to the A/B assembly. On the top edge of one side, draw an arrow pointing toward the end of the guide rail that curves up to a point. (You can see the arrow on the jig in the photo *above right*.) Coat the curved edges with wax.

Mount a ¼×6×6" auxiliary base on your router, and install a ¾" straight bit. (We opted for one with a ½" shank to stand up to the heavy cutting.) Adjust the bit to extend 1 9/32" below the base.

Continued on page 14



SEAT ROUTING JIG

Continued from page 10

ROUTING A CHAIR SEAT

Clamp the jig to a piece of scrapwood (we used a 2' length of 2×8), with the arrow pointing to your right. Then, place the router at the left end of the jig, turn it on, and make a full pass in the direction of the arrow. Turn off the router, and lift it from the jig. The bit will cut a ramp in the spacer block at the left end of the jig. You'll use this sloped slot to align the jig when shaping the seat.

Now, rout the scoop-out

Photocopy the Full-Size Seat Pattern, found in the chair patterns package. (See *page 53* for information on ordering the chair plans.) Trace the outline for the scooped-out area onto a piece of ¼"-thick plywood or hardboard that's the same size as your seat blank. At the front of the seat, trace along the outward-flaring dotted lines rather than the solid line. Draw a centerline from front to back. Set the plywood aside for later use. If you haven't already adhered the pattern to the top of the seat blank, do so now, using spray adhesive.

Clamp the seat blank to your workbench. Place the jig on the blank, aligning the corners of the jig's exit ramp along the solid pattern line on the right side of the seat. (The photo *bottom left* shows the alignment points at a later stage of the routing.) Slide the jig straight toward the front edge of the blank so about ⅔ of the ramp's width lies over the blank, and clamp it in place. Be sure the clamps won't interfere with router movement in the guide rails.

As you move the jig around the seat, align both corners of the exit ramp along the pattern line, as indicated by the arrows. Place the jig so you cut with about two-thirds of the bit's width.

Then place the router at the end of the jig that's toward the center of the seat. Turn it on, and slide it along the curve in the guide rails. As you exit the cut, turn off the router; then lift it from the jig. Don't lift the router out of the jig before turning it off, and don't try to go back through the cut in the other direction.

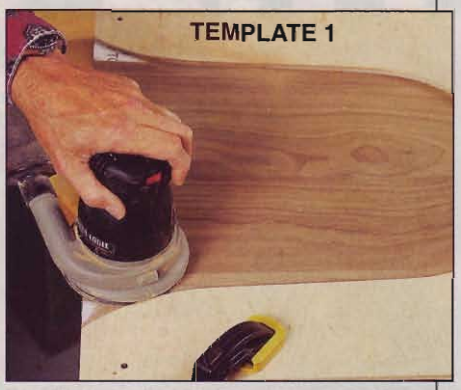
Unclamp the jig, and move it to make the next cut. Again, align the corners of the exit ramp with the pattern line, and position the jig so you'll be cutting with about two-thirds of the bit's width. Start the router, make another pass as before, and shut off the router after the bit exits the work. Periodically recheck the router-bit protrusion distance and ensure that the collet is tight.

Continue moving the jig around the blank counterclockwise, always moving the router in the direction of the arrow, as shown in the *opening photo.* We made 74 passes when we routed our chair's seat.

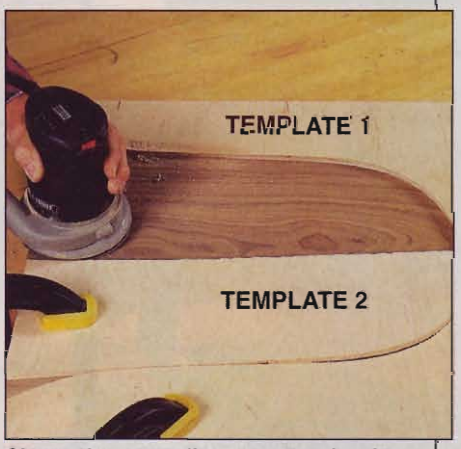
Sand the seat for smooth sitting

Now, cut two sanding templates from the sheet material you traced the pattern onto earlier. To make template 1, bandsaw along the seat-recess outline, making a smooth, flowing curve. For template 2, saw the cut-out piece into two parts just to one side of the line. Save the part with the line on it to use as template 2.

Attach template 1 to the seat blank, ensuring that the opening coincides with the edge of the area to be routed. (We fastened the template in position with screws driven into waste areas.) Then, with a random-orbit sander and 100-grit abrasive, sand from the lowest point in the seat to the edge. Fair the flared front edge into the seat. Bring the sanding disc right up to the template, as shown in the *top* photo. Do not sand down the peaked area at the center front of the seat. Repeat sanding with 120- and 150-grit paper.



Sand the routed hollow with a random-orbit sander. Bring the disc right up to the plywood template, which is fastened to the blank with screws or brads driven into waste areas around the outside.



Clamp the centerline template in place, and sand right up to its edge. Flip the template, and clamp it into the other side of the seat to complete the ridge.

After sanding to the edge all around, clamp template 2 in position, as shown in the photo *above*. Sand from the low point to the straight edge of the template to establish the center ridge at the front of the seat, using progressively finer grits as you did with the edge. Flip the template, move it to the other side of the seat, and sand the other side of the ridge.

Remove the templates, and complete the seat as explained in the main rocking chair article.

Photographs: Hetherington Photography
Illustration: Roxanne LeMoine; Lorna Johnson

Anyone care for a Ring Remover?

Water and heat rings on tabletops and other surfaces rank high on the list of common finish faults. Here are some tricks that just might make them go away.

Take your pick of tricks for clearing up white marks, such as the blemishes at the front of the serving tray.

"There are no guarantees when it comes to removing water and heat rings," according to furniture repair and finishing ace Jim Kull. "Some methods for getting rid of white marks are potentially damaging to the finish," Jim says. "And ultimately, all efforts may fail, leaving stripping and refinishing—or living with the marks—as your only options."

But if you're game, it might pay to try some of these tricks before you resort to refinishing.

Let's see what you have there

Start by assessing the damage. "A simple repair may be possible for finish discoloration, damage that doesn't penetrate the wood," Jim says.

The mark itself will tell you a lot

✔ A white mark signifies damage to the finish only.

✔ A darker mark denotes damage that's gone through to the wood.

Check the surface, too

✔ An unmarred surface over the mark generally indicates damage caused by moisture.

✔ A slight indentation over the area usually points to heat damage.

Play it cool with heat marks

"Often your only solution for heat marks is to strip and refinish the surface," Jim says. Even so, you may be able to clear heat marks in shellac or lacquer finishes. Here's how to determine whether the finish you're dealing with is lacquer or shellac.

✔ Dab a little denatured alcohol on the finish in a hidden spot. If the finish softens, it's shellac.

✔ If it doesn't soften, try the same thing with lacquer thinner. If the finish softens now, it is lacquer.

✔ If neither has an effect, you're contending with some other finish.

Shellac or lacquer tricks

Clean the area thoroughly with paint thinner. Then, wash it with a mild soap, such as Murphy's Oil Soap. Wipe it down again with paint thinner, and let it dry.

Wet the finish directly over the mark with alcohol (for a shellac finish) or lacquer thinner (for a lacquer finish). "It's best to spray it on," Jim says, "but you could brush on a wet coat and leave it. Don't rub it." The solvent dissolves the finish, which will then reflow as it dries, maybe erasing the mark. "This may not work," Jim cautions, "but it's worth the effort."

Try buffing for other finishes

"Buffing is my least favorite approach; it rarely works for me," Jim warns. "And you can easily polish right through a thin finish." If you buff, apply a fine-grit automotive polishing compound with a high-speed buffer and a lamb's wool pad.

Now let's dive into water marks

Jim reports mixed results with commercial white-ring removers. The Jasco ring-remover cloth shown *below* (from Restoration Hardware, 800/816-0901) renders most rings less visible. An almond stick works in many cases, too. With either, the rings may reappear after time.

Rubbing with this chemically treated cloth minimizes the white mark.

Go for the grease

An easy fix to try is to smear mayonnaise, petroleum jelly, or shortening on the mark. (Jim likes mayo on his furniture because it's easier to clean up.) Slather it on generously, and leave it overnight. The idea is to let oil seep in to clear the mark.

"If that didn't quite do the trick, try again," Jim counsels. "If another application doesn't get it all, you need to try something else."

Beyond sandwich spread

That something else would be wiping gently with denatured alcohol. "But be careful," Jim cautions. "Alcohol will dissolve shellac, mess up a lacquer finish, and damage some water-base finishes."

For this procedure, fold cheesecloth or cotton fabric into a pad, and dampen it with alcohol. It should be thoroughly damp, but not wet.

"Then," Jim explains, "gently, gently, gently wipe the pad over the ring area. Swing your arm, brushing the pad across the mark much like an airplane landing and taking off, with the landing being very soft. Don't rub," he says. "A slight haze should appear; this is the alcohol evaporating and, we hope, taking the subsurface moisture with it."

If that doesn't happen, you could try the same tactic again, but using lacquer thinner. "This technique, which is best left to pros, could totally destroy the finish," Jim warns. But by this point, you may have become resigned to refinishing, anyhow.

Written by Larry Johnston with Jim Kull
Photographs: Hetherington Photography

WOODWORKERS TO THE RESCUE

Comments, answers, and ideas from our *WOOD ONLINE*® discussion groups

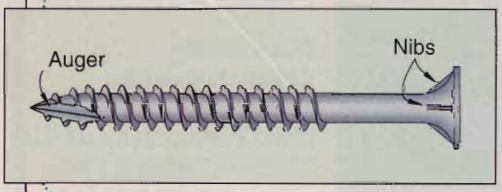
Note: If you would like more information on the woodworking-related subjects featured here, visit our *WOOD ONLINE* discussion groups at www.woodmagazine.com.

We have edited all entries in the interest of brevity and clarity while preserving the message. In addition, we have included our response to some questions.

Looking for advice on fastening composite materials

Does anyone out there have an opinion on what glues and screws work best with medium-density fiberboard (MDF)? I know that it wants to split out with tapered screws, but I understand that there are several thread designs available that might do the trick.

—Roy Freeman, Seward, Alaska



● I have had good fortune with screws from McFeely's (800/443-7937) made for composite materials like MDF, particleboard, and the like.

—Rick Van Schoick, West Chester, Pa.

● I have been a cabinet builder for 17 years and have used MDF for the last 10. The material will work fine with yellow glue and nails. A dado joint is better than dowels or biscuits in MDF.

—Darrell Strickland, England, Ark.

● Roy, we posed your question to Jim Ray of McFeely's, and he confirmed that his company sells a line of screws (with part nos. ending in "FXT") that work well with composite materials, such as MDF and particleboard. These screws have auger tips, which help the screw evacuate material, and nibs on the underside of their bugle heads that carve out some countersink material. They also have wide (coarse) threads for distributing the fastener load.

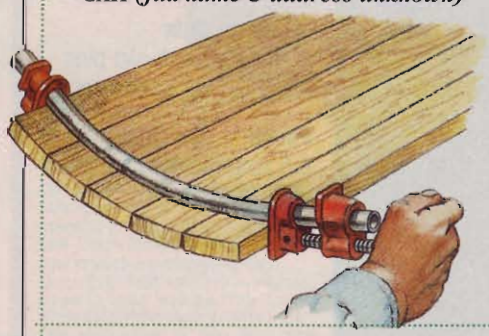
Still, Jim cautions that even with these screws you should pre-drill and countersink any fasteners placed near the edge of composite materials. Otherwise, the wood particles simply will crumble around the fastener.

—WOOD® Magazine

How much pressure should I put on pipe clamps?

Do 4'-long pipe clamps normally bend, or did I simply tighten them too much?

—GAH (full name & address unknown)



● Temporary bowing could be normal if you used ½" pipe, but I'd say that if you actually bent the clamps (the pieces that fit on the pipe) using ½" pipe, or bowed ¾" pipe, you overdid it on the pressure. A good rule of thumb is to use just enough pressure to start forcing some glue squeeze-out from the joint. No squeeze-out under lots of pressure means you may not have applied enough glue to the joint.

—Ray Cox, Lawton, Okla.

● Your joint should fit together snugly, and then it won't require lots of clamping pressure. If the joint has to be forced together under heavy pressure you may encounter problems later on. This also makes it much more difficult to make everything square.

—John Harden, Rancho Cucamonga, Calif.

Gluing brass to wood can be sticky business

I am doing a carving, and included in it are three pieces of brass that I want to attach to a curly maple background. Does anyone have any tips on types of glue? Or perhaps another method?

—Albert McBride, Fort Myers, Fla.

● Haven't glued any brass to wood, but have secured abalone inlay to cherry burl with 5-minute epoxy, and it held well. With metal, I rough the back with some medium-grit emery before applying a small drop of the epoxy mix.

—Al Archie, Bessemer, Mich.

● You may want to try hot-melt glue or silicone sealer (aquarium type). You can't go wrong with the fast-cure epoxy. Hot-melt glue is fast and convenient. It's also more forgiving; you could pull it off if needed. It may not hold up over time as well as epoxy.

—Sam (full name and address unknown)

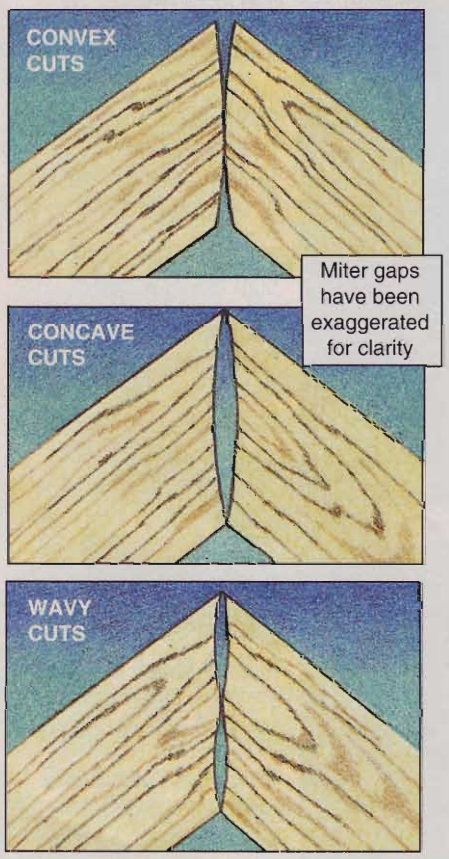
Continued on page 20

Continued from page 18

In search of great mitersaw cuts

I have the Makita LS1013 sliding compound mitersaw. Today, I was attempting to miter some picture frame molding that was 2½" wide and made of black cherry. The fit is only tight in the center—the two edges do not meet. I clamped the piece in place before cutting. What could I be doing wrong?

—Joe Gorleski, Bel Air, Md.



● I have the same saw and also was having problems. But, instead of convex cuts, my problem was a concave cut. At a woodworking show I talked to the Makita representative who said the problem was my blade. I replaced it with a Skarpaz 60-tooth, ⅛"-kerf blade from White Engineering (619/475-6166), and bingo, the problem disappeared. I had tried stabilizers, new clamps, different wood, everything except a different blade.

—Douglas Parker, San Diego, Calif.

● Picture frame moldings can be the most demanding of all miter cuts, but I routinely cut them with a 12" Makita mitersaw with an extremely sharp 100-tooth picture-frame blade (the model U1210-6 Ultramitre blade from Industry Saw Blades, Burbank, California, 800/433-3140).

I believe a mitersaw to be slightly more stable for this kind of work, but your slider should be able to handle the task. On rare occasions, I'll correct a bad miter cut with my Delta Sanding Center's extra fine sanding disc. I use it with a miter gauge set at 45° and lightly touch the mitered corner to the disc.

—Bruce McElhaney, Livonia, Mich.

● I had a similar problem and found that I was not using a straight pull down on the handle, and was going too slow on the cut. Once I started making my motions consistent and straight, the problem cleared up.

—Don Sindledecker, Ketchikan, Alaska

● I have a 10" mitersaw that did not cut right, too. My cuts were wavy and sometimes only met the other piece in the center. I found that I needed to use a stabilizer (a round metal plate several inches in diameter) next to the blade. It will not change the position of the blade if it is used on the outside.

—Tom Pedlow, Perry, N.Y.

● I use a Forrest Chopmaster 80-tooth blade in my old Ryobi 10" mitersaw, and get perfect miter cuts with no burning. No stabilizer required. It makes a perfect glue edge with absolutely no sanding required and no gaps if I cut to proper lengths.

—Mike Kelly, Austin, Texas

Followup from Joe Gorleski:

● The final solution was to replace the original blade with a new one that had fewer teeth. I believe the old blade was burnishing the wood enough to compact the fibers and make the cut inaccurate.

Curing coat trees with weak legs

I'm making several children's coat trees. Each leg is biscuited and glued to the tree, which is 3" square and 4' tall. Legs are of 1" pine, ¾" actual. I prefinished several of those and they fell off, due to glue failure. Should I switch to wood dowels?

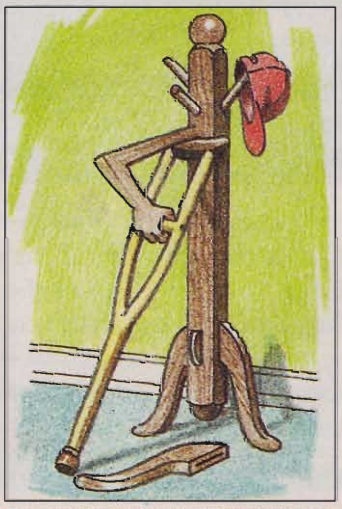
—Smitty, address unknown

● I had a similar problem with about a 4' item made of cherry. I had attached each leg with two dowels. They kept coming apart, so I glued them with two-part epoxy. They have held ever since.

—Mark Metko, Larsen, Wis.

● If you have a router table, I would suggest that you abandon dowels and biscuits and go with a sliding dovetail joint. In my opinion, this is a very easy joint to make, and the legs will not fall off. They will break off first. If you don't have a router table, I would screw the legs to the post and countersink and plug [the holes].

—Bryce Templeton, Austin, Texas



Illustrations: Jim Stevenson

Are You Stumped?

If you've got a question that you think would interest other readers, we would like to hear from you. Write to: Ask *WOOD*®, 1716 Locust St., GA310, Des Moines, IA 50309-3023. For an immediate answer to your question, try posting it on one of our 10 internet discussion groups at: www.woodmagazine.com

Follow-up question on Ark project technique

For the Noah's Ark project in issue #109, you suggest using a "not quite sharp #2 pencil" to scribe the lines in the deck. I had a hard time burning these lines in afterward to make them look as neat as I'd have liked. I don't know if I should have scribed the lines deeper and followed the groove, or tried a different woodburning tip than the "universal" style I used.

Frank Hawkins, Riverview, Mich.

Frank, you can't quite tell from the photos of the ark we built, but those woodburned lines in the deck are and definitely look handcrafted, not precise in the way a machine might make them. Still, the rough-hewn look gives the ark an authentic "Old World" feel we like.

As far as the woodburning tool goes, if by "universal" you mean a round-pointed tip, that style does make following the pencil lines a little harder. We used a wedge-shaped "knife" tip, which tracked well even in the relatively shallow pencil grooves.

Why are my sanding discs burning my work?

I've enclosed a 12", 220-grit sanding disc with a buildup of some sort around the outer edge. What is the material? What is causing the buildup, and more important, what can I do to prevent it? It leaves burn marks on workpieces. (I was sanding kiln-dried cherry with this disc.) Thanks for your help.

Eugene Bigelow, Niwot, Colo.

The disc alone is only circumstantial evidence, Gene, but together with your description it offers some solid clues to unravel this mystery.

The problem, called "glazing," occurs when the abrasive on the disc becomes saturated with foreign material, usually resins contained in the wood you're sanding. Cherry is prone to burning, and it often has small inclusions of resin (called pitch pockets) that can gum up abrasives. When the abrasive becomes "loaded" like this, it merely rubs the wood surface instead of cutting particles away. The friction and heat produced cause the burn marks.

The location of the buildup offers another clue that the problem stems from a vicious circle (no pun intended) of heat and friction. On popular combination belt/disc machines, the typical 2,100-2,400 rpm spindle speed translates to a disc rim speed of 75-85 miles per hour, much faster than the speed at the center portion of the disc. This discrepancy means the outer edge will heat up and glaze before the rest of the disc does.

You can't fight the physics of a spinning circle, but you can work around them. First, try to avoid using the very outside edge of the disc. Second, switch to coarser abrasives that won't load up as quickly (120-grit is as fine as we go in our shop). Third, clean the disc regularly with a crepe rubber block (available from Klingspor's Sanding Catalogue, 800/228-0000, or other woodworking retailers).

Finally, consider slowing the machine speed by changing the drive and/or arbor pulleys. But fair warning: Disc-only sanders typically run at 1,725-1,800 rpm, while the faster speeds on combination machines are a concession to the belt sander's requirements. You may not be able to reduce the speed even if you want to, as it might affect the tool's performance. As a precaution, speak to a technical representative from the manufacturer and explain what you want to do.

We salute Top Shop Tip winner Curtis George, shown with his latest work-in-progress: a walnut flag case.

Curtis George still uses his first real power tool: a second-hand Black & Decker jigsaw that he got when he was 10 years old. But his love of all things wood began a couple of years earlier when he helped his mom refinish the wooden furniture around their house.

Now that he's grown up, Curtis still enjoys refinishing. But when he's feeling creative, he likes to take a turn at the lathe and crank out kids' toys, such as wooden tops. Toys aren't the only "top" things coming out of Curtis's shop, though: Check out his Top Shop Tip at *right*.

We'd love to hear how you've solved time, money, or space problems in your shop. If we print your idea in an upcoming issue, we'll line your pocket with $75, and you could win our Top Shop Tip tool prize worth at least $250. Mail your best tips, along with photos or sketches and your daytime telephone number to:

Tips From Your Shop (and Ours)
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Dave Campbell
GENERAL-INTEREST EDITOR

Auxiliary drill-press table works neat as a pin router

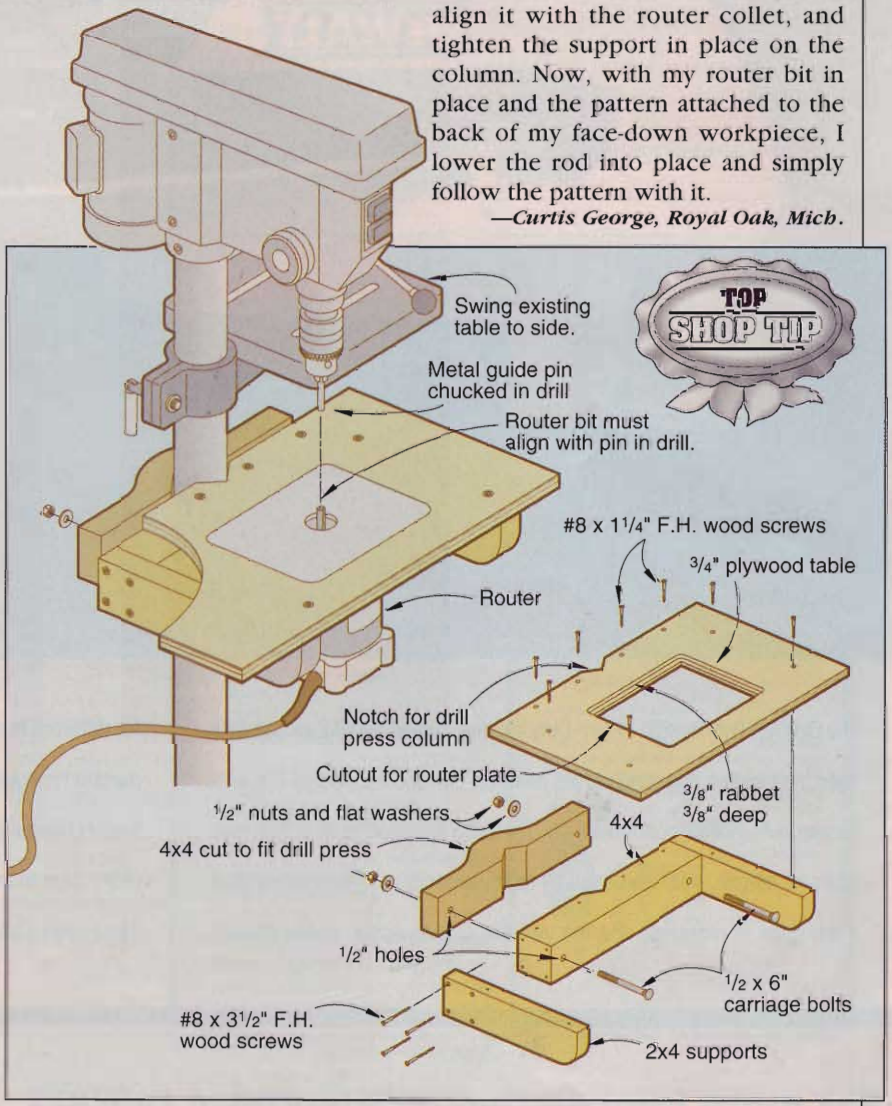
When I needed a pin router for chanelling out a tray, I decided to make one rather than buy it. I fashioned a router-table support base of 2×4 and 4×4 stock, as shown in the drawing *below*, and mounted it to my drill-press column.

After machining the tabletop and mounting my router, I inserted a short length of ¼" steel rod into the drill-press chuck. I then placed the tabletop on the supports, lowered the drill-press quill, centered the router collet on the rod, and attached the tabletop to the support base. The distance to the column is the critical dimension here because I can rotate the jig to get my side-to-side alignment.

Top Shop Tip winner Curtis George will keep workshop dust under control with his new Grizzly G1029 dust collector. Kudos, Curtis!

To rout patterns with the jig, I again chuck the rod into the drill press, align it with the router collet, and tighten the support in place on the column. Now, with my router bit in place and the pattern attached to the back of my face-down workpiece, I lower the rod into place and simply follow the pattern with it.

—Curtis George, Royal Oak, Mich.


TOP SHOP TIP
Swing existing table to side.
Metal guide pin chucked in drill
Router bit must align with pin in drill.
#8 x 1¼" F.H. wood screws
¾" plywood table
Router
Notch for drill press column
Cutout for router plate
⅜" rabbet ⅜" deep
½" nuts and flat washers
4x4
4x4 cut to fit drill press
½" holes
½ x 6" carriage bolts
#8 x 3½" F.H. wood screws
2x4 supports

Continued on page 26

Continued from page 24

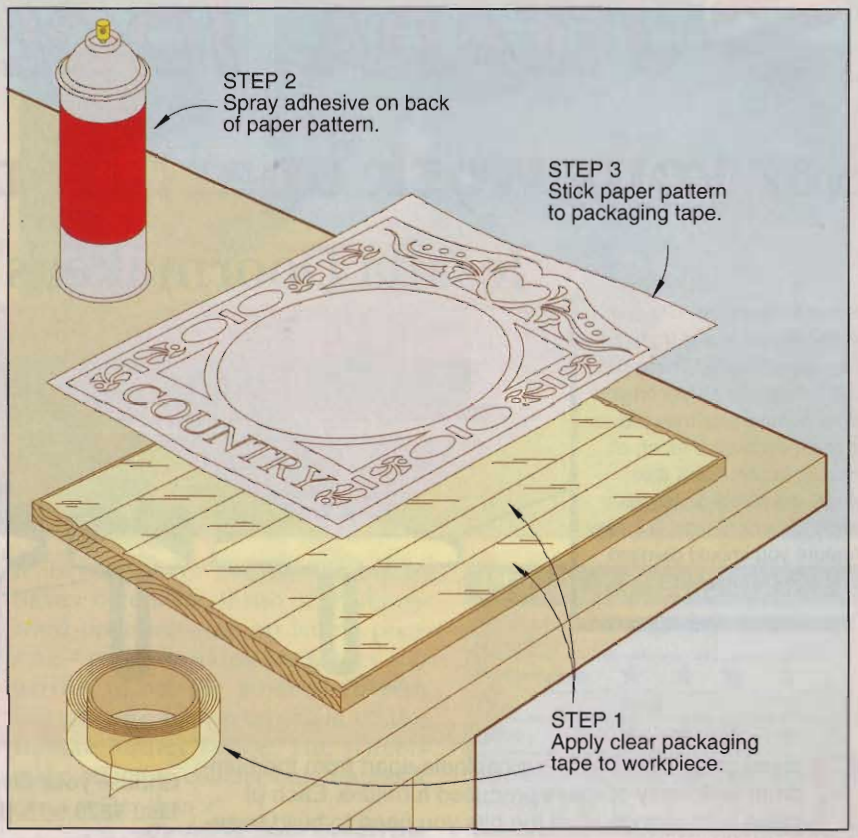
Spray's too sticky, so use packaging tape first

As a scrollsawyer, I've never been happy with the most common methods used to secure patterns to a workpiece. I always seem to use too little or too much spray adhesive,and double-faced tape is a bear to remove.

So, instead of adhering the pattern directly to the wood, I now put down a layer of clear packaging tape, as shown at *right*. Then I spray adhesive liberally on the back of the paper pattern and stick it to the tape. After cutting out the pattern, I remove the tape and pattern together with no residue left on the wood.

Go easy, though, on narrow pieces, especially workpieces less than ¼" thick—the tape grips well enough to break fragile parts. For such pieces, I find it works best to pull the tape straight back on itself, rather than lifting it straight up. As an added benefit, the tape seems to lubricate the blade, resulting in less burning.

—Dale Olschowka, Hollister, Calif.



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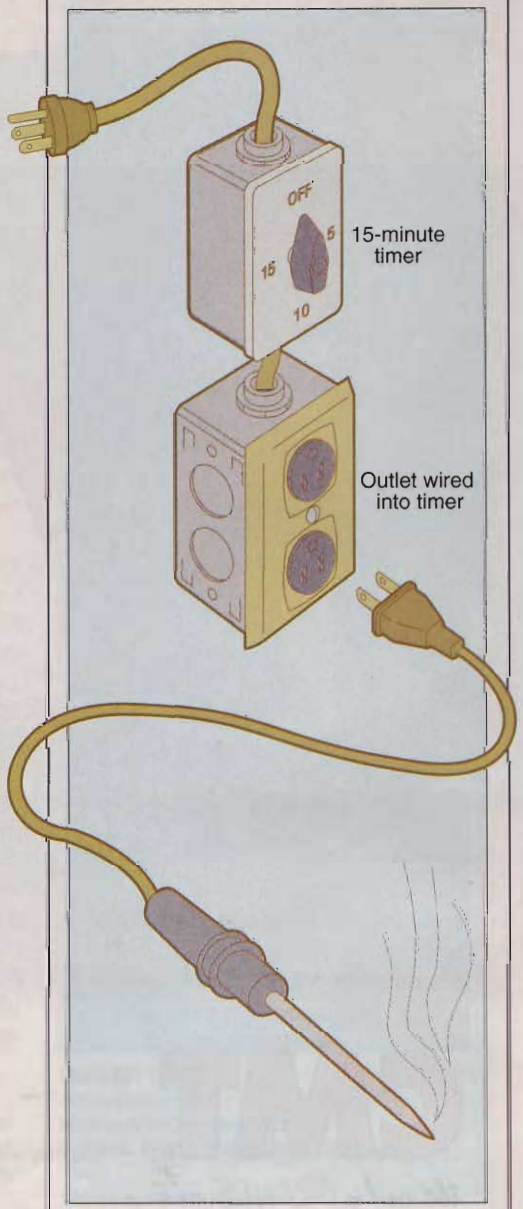
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 26

Timer remembers to turn off "hot" tools

I was fortunate to have not caused a fire when I forgot and left a hot-melt glue gun plugged in. To safeguard against future forgetfulness, I built a timer to automatically turn off "hot" tools. I bought the 15-minute timer at the local hardware store and wired it to an outlet box, as shown *below*. Now when I use a hot-melt glue gun or soldering iron, I plug it into the outlet and turn on the timer. If I need more time, I simply reset the timer.

—Alan Bradstreet, Pownal, Maine



Continued from page 30

TIPS FROM YOUR SHOP (AND OURS)

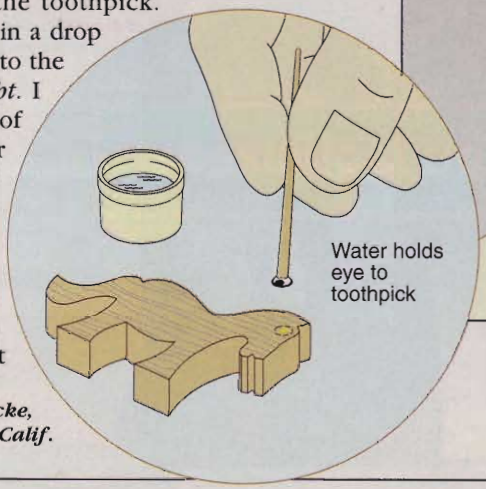
Continued from page 28

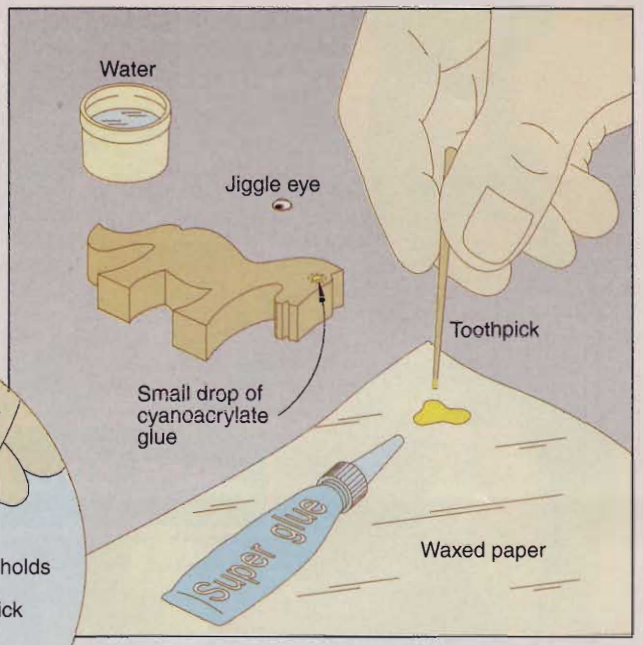
Tiny eyes giving you trouble? Poke 'em on with a toothpick

I sometimes need to attach tiny jiggle eyes to the children's toys I make. Unfortunately, those little devils are hard to handle with grown-up fingers. And it's easy to apply too much cyanoacrylate (CA or instant) adhesive, which can stain the workpiece and cloud the clear plastic of the eye. When stuck in this situation, round toothpicks come to my rescue.

Using sandpaper, I flatten both ends of a toothpick—one end just slightly to remove the point, and the other to the full diameter of the toothpick. First, I dip the small end in a drop of CA and apply the glue to the toy, as shown *at far right*. I then dip the broad end of the toothpick in water and touch it to the top of the jiggle eye. The surface tension created by the water allows me to carry the eye to its mounting location, where it releases without moving out of position.

—Michael P. Locke, Huntington Beach, Calif.





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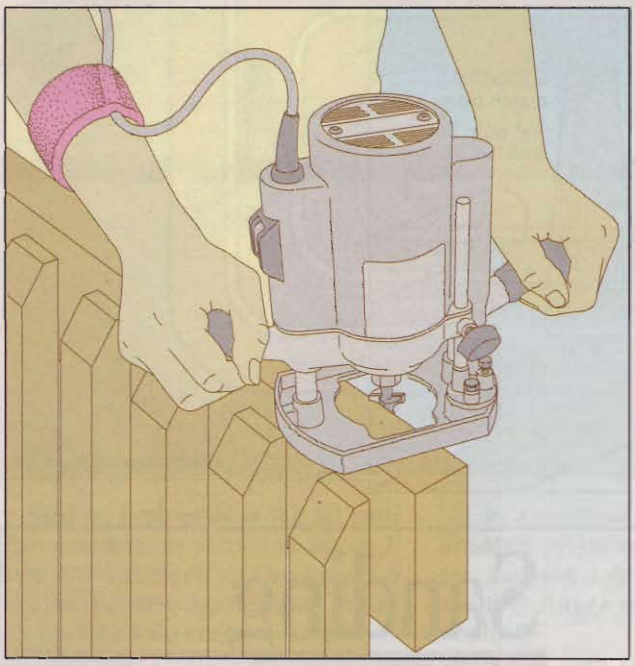
Sweatband keeps corded tools from going cordless

Dealing with a dangling power cord creates a whole handful of hazards—you can accidentally cut through it, it can get caught and pull your attention away from your work, and it's just plain annoying. To avoid the danger, I slip an elastic wrist band (like you might use when playing tennis) up to just below my elbow, and run the power cord through it, as shown *below*. The band keeps the cord well away from the cutting tool.

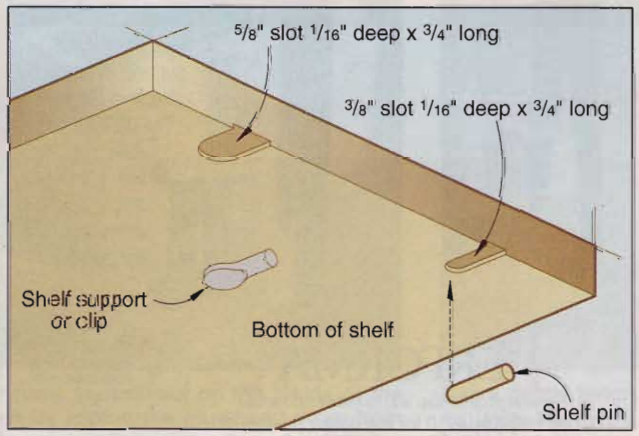
—Barbara Dorin-Bach, Kailua-Kona, Hawaii



Stop shelf slippage with slots

Adjustable shelves in a bookcase or entertainment center tend to fit loosely so they can be moved easily. But that built-in sloppiness can be a nuisance when the shelves shift. To minimize this problem, rout shallow slots about the same size as your supporting pin or clip in the bottom of each shelf.

—Chuck Hedlund, WOOD® magazine shop manager



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(By Frank K. Wood)

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 31

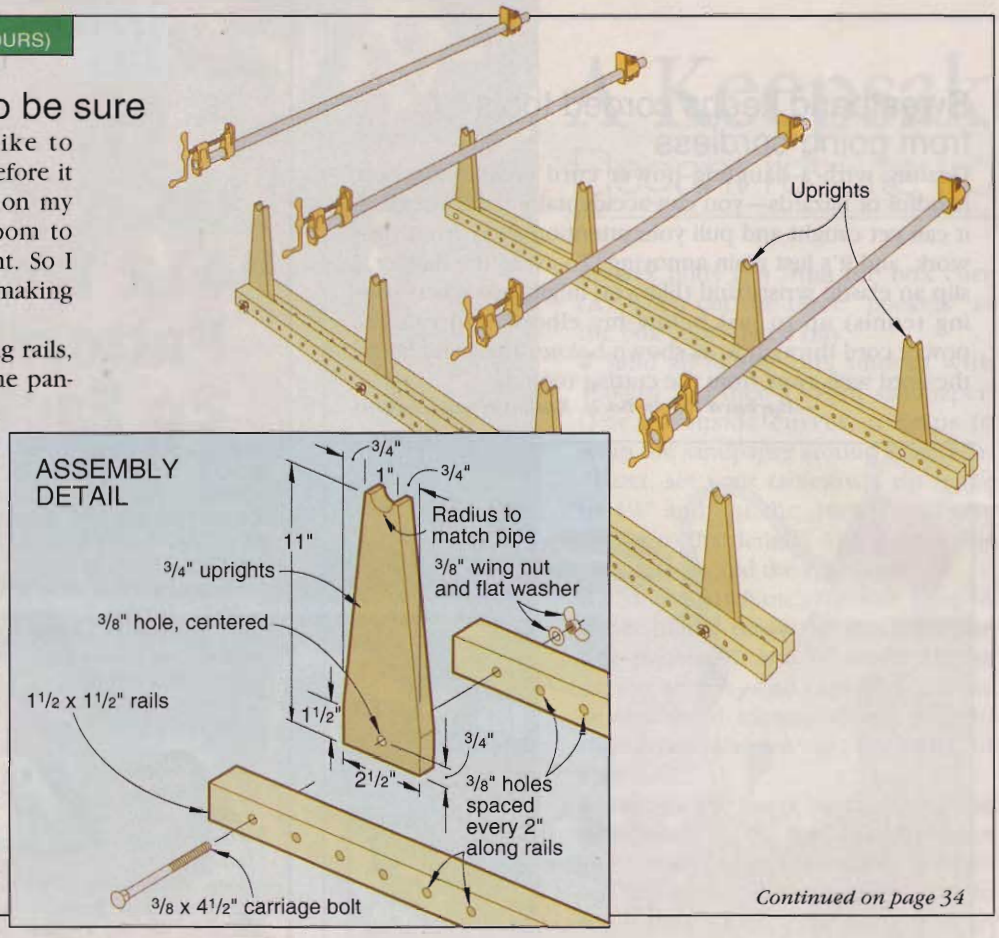
Raise your clamps to be sure

When gluing up panels, I like to remove the glue squeezeout before it sets. But pipe clamps laid flat on my assembly bench left me no room to clean the underside of the joint. So I found a way to take my panel-making to a higher level.

I made a pair of clamp-holding rails, as shown *at right*, that raise the panels nearly a foot above the bench. Each upright can be moved individually to accommodate different-size panels by simply removing the wing nut and carriage bolt.

Besides giving me more space for cleanup, the rails let me inspect both the top and bottom of each joint without flipping the assembly. And, if I find the need to add panel-flattening cauls across the joints, it's easy to attach them with a C-clamp or handscrew.

—Ronald Huizenga, Morrison, Ill.



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TIPS FROM YOUR SHOP (AND OURS)

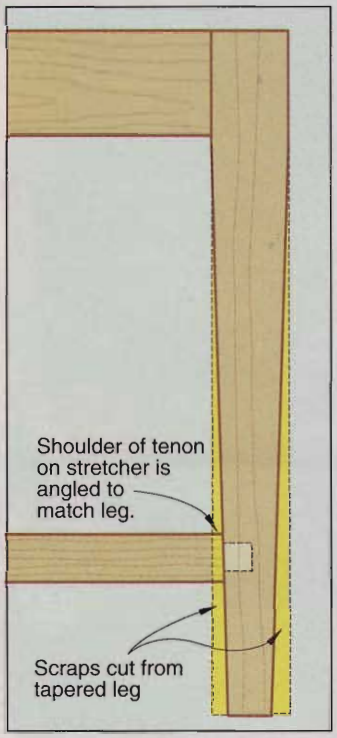
Continued from page 32

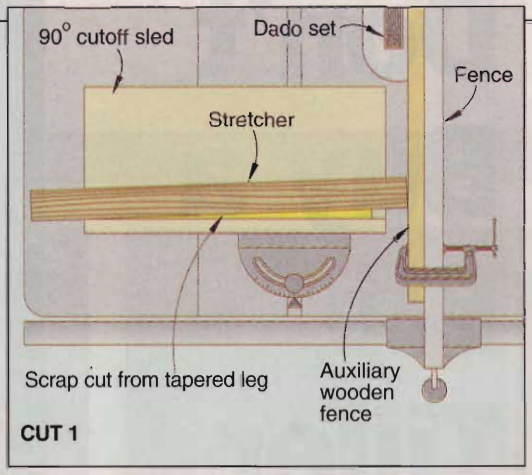
Made-to-match tenons for tapered legs

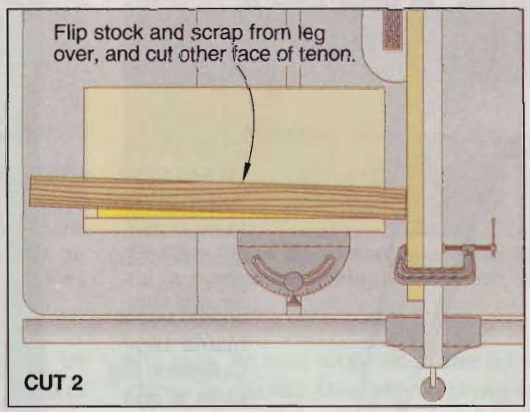
When mortising a stretcher into the tapered part of a table leg, matching the angle on both shoulders of the tenon doesn't have to be a mind-boggling operation. Start by cutting the mortise in the untapered leg, then trim the waste from the leg using a tapering jig on your tablesaw.

Next, take one of the offcut tapers and place it against the fence of your cutoff sled (or your miter gauge set to 90°), as shown in the Cut 1 Drawing, *above right*. Hold the stretcher against the tapered scrap, and cut one shoulder of the tenon with your dado set. Now, flip the stretcher top-to-bottom and the tapered scrap end-for-end (as shown in the Cut 2 Drawing), keeping the point of the taper at the edge of the sled. Cut the opposite shoulder without changing the tablesaw fence. Finally, make the top and bottom shoulder cuts by hand or with a bandsaw.

—David Sobel, Tampa, Fla.







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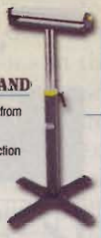

D2272 TILTING ROLLER STAND
- Adjusts in height from 25¼" to 43¼".
- Rollers Tilt from 0° to 45°
- All-steel construction
- 1⅝" wide ball bearing rollers

D2274 5 ROLLER STAND
- Adjusts in height from 26½" to 45".
- All-steel construction
- 1⅝" wide ball bearing rollers

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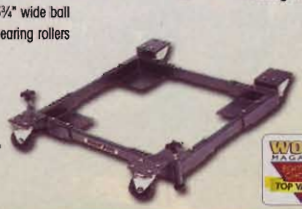

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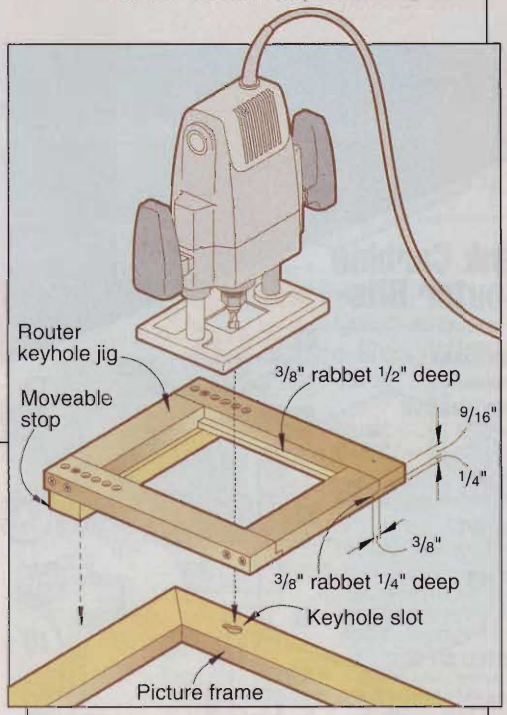
Circle No. 860

How do you top a Top Shop Tip?

I loved the keyhole cutting jig in *WOOD®* magazine #112 because I make a lot of frames and always use keyhole slots. But I found a way to make it even better: I left a ¼" flange on the inside of both rails (as shown *below*) for my router to ride on. I have to set my keyhole bit a little deeper, but the rabbets keep my router from dipping side-to-side.

—Luther Williamson, Columbia, Md.



A FEW MORE TIPS FROM OUR WOODWORKING PROS

- When tiny drill bits snap mid-task, they can take you almost to the breaking point. See Photo E on *page 56* for an easy way to prevent bit breakage.
- Boring holes at compound angles challenges even the most experienced woodworker. On *page 60*, see the drill-press angle jig we made to help with the adult rocker.
- Learn how we employed a router and scrollsaw to make long, straight decorative cutouts. Photos A and B on *page 48* show the process we used when building the nesting tables.

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Forests for the Future

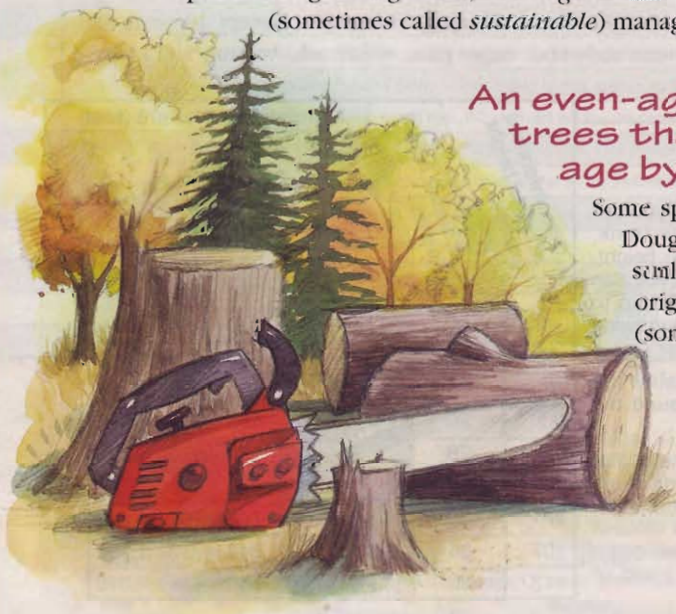
Granted, trees grow without any help. But to bring you lumber and veneer, foresters find ways to grow them bigger, better, and forever. Here's how they do it.

Once upon a time, most wood came from *old-growth* forests that had trees hundreds of years old. Now, due to past logging and conservation measures designed to protect old-growth forests, most wood comes from *second-* and *third-growth* forest land; that is, from trees that grew after logging activity. Some of this forest land belongs to the public as state and national forests. (Logging is *never* permitted in national parks and monuments or designated wilderness areas.) The rest is in private ownership, managed as commercial *timberland* to provide lumber and other forest products.

Today, a well-managed forest not only produces desirable trees for everything from woodworking stock to newsprint, it also maintains wildlife resources, protects natural watersheds, and provides beauty. Public forests also must meet recreational needs.

Two ways to make a forest grow.

Due to rugged terrain, poor soil, or an unfriendly climate, some forests never produce trees large enough for commercial use. But where trees can grow to good size, foresters have two options for growing them, *even-age* or *uneven-age* (sometimes called *sustainable*) management.



An even-age forest has trees that don't vary in age by more than 20 years.

Some species of trees—aspen, black cherry, birch, California redwood, Douglas fir, red pine, and southern pine, for example—require the sunlight provided in this type of forest. It's created by cutting all the original trees to make way for the natural regeneration of seedlings (sometimes supplemented by planting).

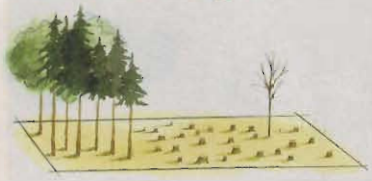
An uneven-age forest contains trees of all ages.

There are tree species, such as oak, ash, white cedar, and sugar maple, that grow better in the shade of larger trees. To get a desirable mix of existing trees, the forest has to be cleaned of all dead, damaged, or unwanted ones.

Continued

Foresters meet the needs of the tree species growing naturally in their timberlands—or of the ones they want to grow—with different practices.

For even-age-forests:

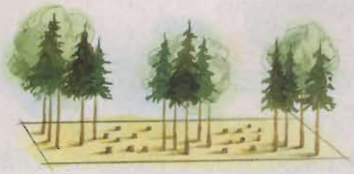


Clear-cuts require removing all trees larger than 1-2" in diameter. Remaining trees provide wildlife support and some stream protection. Trees that grow well under the newly created sunlight are *pioneers.* Eventually, their greenery induces the vigorous growth of shade-loving trees such as ash, basswood, beech, and birch. States and the federal government frequently limit the size of clear-cuts for environmental reasons (to prevent serious erosion, for instance) or aesthetics.

Seedtree is a practice that—instead of clear-cutting—leaves a dozen or so good seed-producing trees per acre. When young trees eventually sprout and become established, the older seed trees come down. This works best with the same species listed under clear-cut, plus red oak and sugar maple.

Shelterwood, a practice done in two or three thinning-type logging operations over several years, restricts competition from other vegetation for new tree seedlings by providing some shade. The last logging of mature trees delivers the sunlight needed for young trees to grow into an even-aged stand. The forest never looks harvested. It works with shade-loving trees such as ash, basswood, and maple, but also with Douglas fir, Sitka spruce, lodgepole pine, and Eastern white pine.

For uneven-age forests:



Group Selection means that ¼- to 2-acre forest parcels must be cleared of specified groups of tree species and sizes every few years. Openings create some sunlight for species that need it. This practice leaves a forest looking fairly undisturbed but requires intensive management to raise California redwood, sugar pine, white ash, and walnut.

Single-tree requires the spotty harvesting of individual trees to slightly open up the forest to sunlight, which allows seedlings to grow. The cutting also removes undesirables, letting valuable trees add diameter and height. These thinnings occur about every 10 years to encourage the growth of California redwood, sugar pine, white ash, walnut, and many other hardwoods.

How to size up a tree

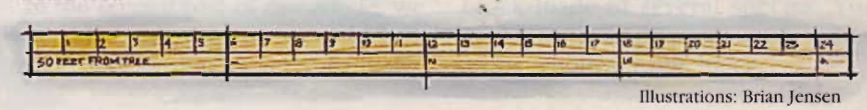
Some trees easily grow over 100' tall. But a timber company only cares about *merchantable* height. That's the measurement from the base of the trunk to the first visible defect, such as a crack, the major fork if there isn't a defect, or where the trunk diameter diminishes to 10" in the absence of a fork or defect. The merchantable height combined with the tree's diameter at breast height (4½' above the ground; called *d.b.h.*) tells about how much wood a tree will yield. Forest pros accomplish this with the help of a scaling stick and conversion tables based on log-volume tables. You can come fairly close calculating board feet in a tree with the method shown at *right.*

1 From 50 paces, visualize yourself standing against a tree's trunk. Then to get merchantable height, imagine how many times you can multiply your height in feet up to the first defect, fork, or narrowing of the trunk to 10" diameter .

2 With a steel tape, measure the trunk circumference (around the tree) at breast height.

3 In the chart, find the diameter that most closely matches the trunk circumference you measured. Read across to find the closest merchantable height, then down to the corresponding yield in board feet.

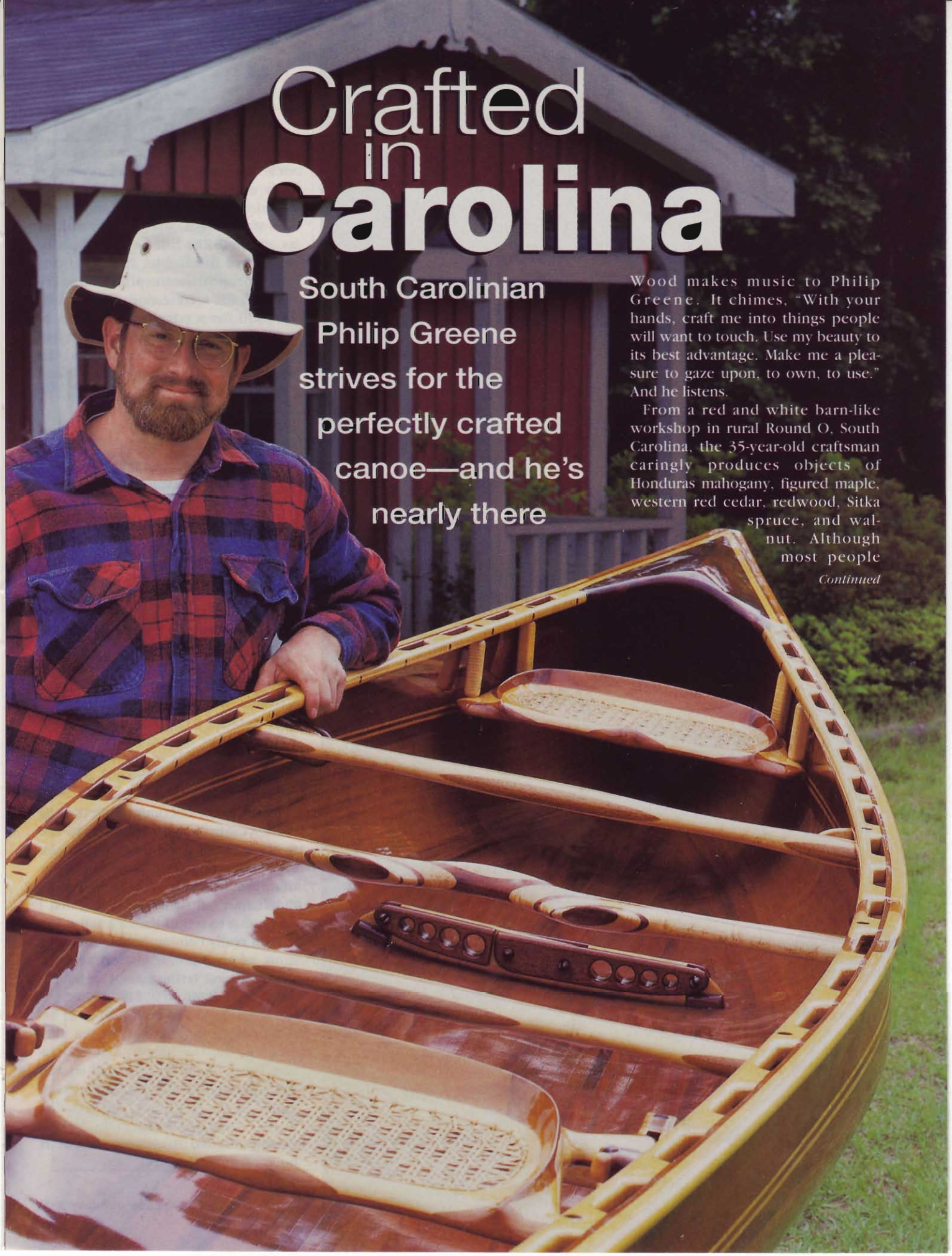
Circumference at breast height (inches)	Diameter at breast height (inches)	Merchantable height (feet)					
		8	16	24	32	40	54
		Yield in board feet					
57	18	72	122	168	207	248	292
63	20	90	156	212	262	317	366
69	22	111	194	262	328	392	450
75	24	137	236	319	400	470	550
82	26	165	281	381	480	565	650
88	28	195	331	450	560	670	760
94	30	227	383	520	650	770	890
101	32	260	440	600	740	890	1,020
107	34	294	500	680	840	1,010	1,160
113	36	330	565	770	960	1,140	1,310



Illustrations: Brian Jensen

Crafted in Carolina

South Carolinian Philip Greene strives for the perfectly crafted canoe—and he's nearly there



Wood makes music to Philip Greene. It chimes, "With your hands, craft me into things people will want to touch. Use my beauty to its best advantage. Make me a pleasure to gaze upon, to own, to use." And he listens.

From a red and white barn-like workshop in rural Round O, South Carolina, the 35-year-old craftsman caringly produces objects of Honduras mahogany, figured maple, western red cedar, redwood, Sitka spruce, and walnut. Although most people

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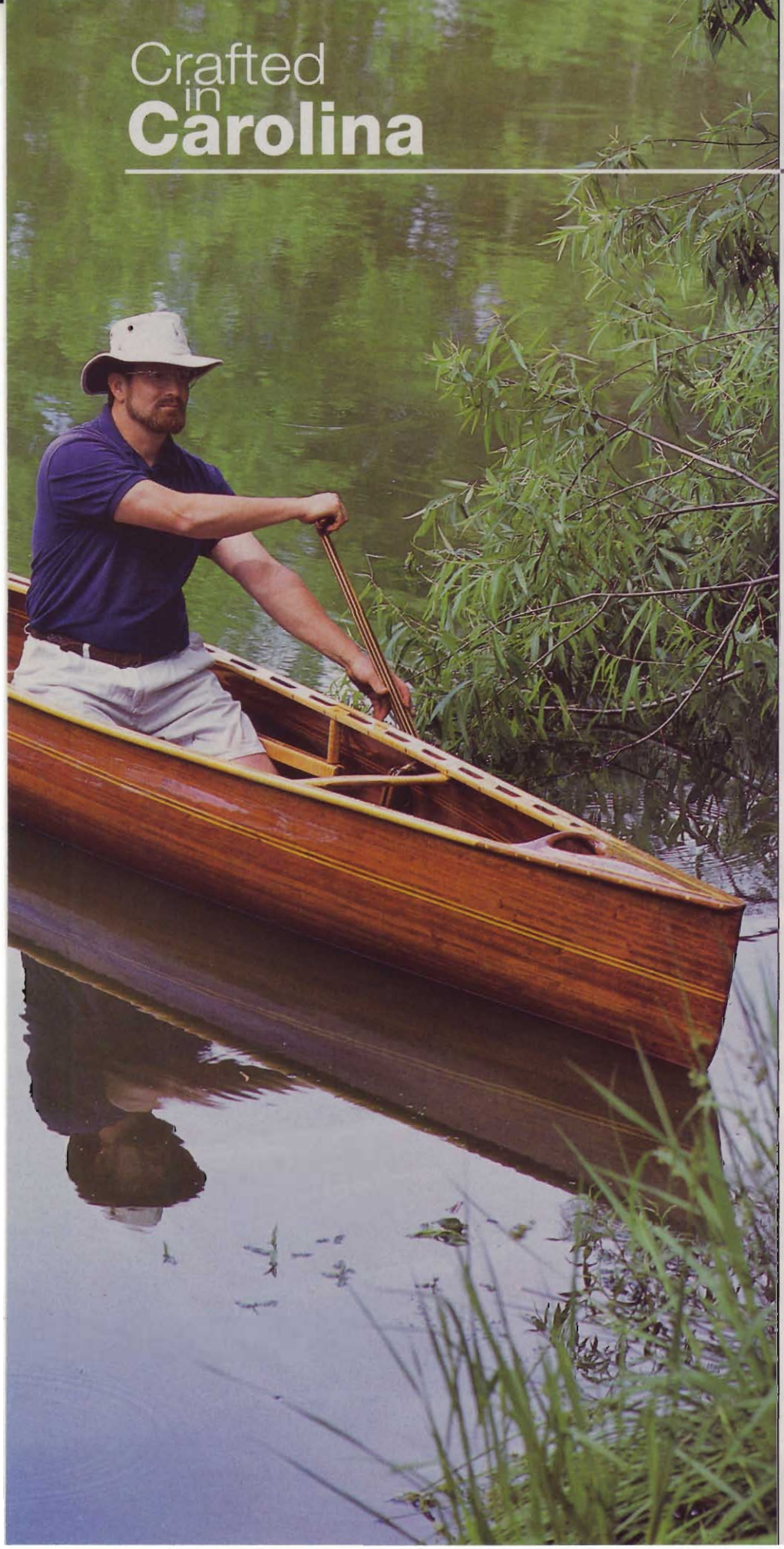
Crafted in Carolina



view the things Phil makes as masterfully crafted strip-built canoes and wondrous paddles for the most serious of canoeists, some look on them as art. And like fine oil paintings or sculpture in marble, the creations carry proportionate price tags. Try $20,000 for a 20' canoe. Or as much as $600 for a paddle. And even at those prices, Phil finds himself a year behind in fulfilling orders for his masterpieces built under the name Wood Song Canoes.

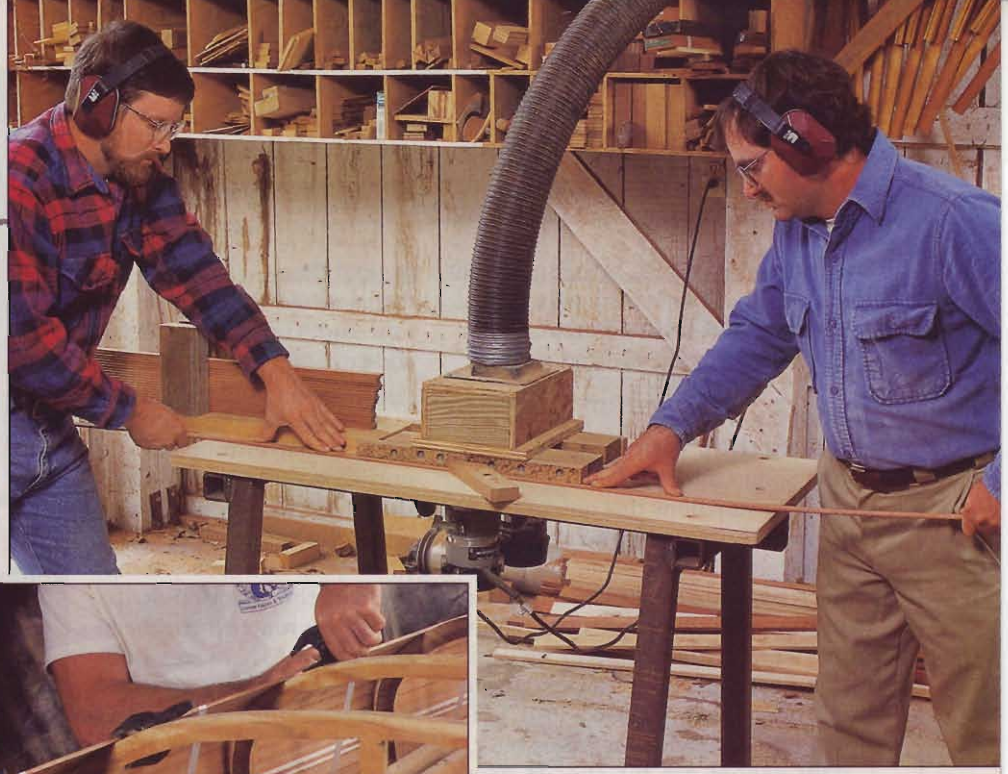
He found a rich niche among wooden boats

Internationally acclaimed woodworker Sam Maloof bought a ⅓-scale canoe model of Phil's in 1997—at 65 percent of full-size price. Then he later ordered a 12' all-mahogany canoe to hang in his home.

John Moores, owner of the San Diego Padres baseball club, has a model displayed in his home, too. Hollywood movie director and producer James L. Brooks also bought one. So did an unnamed man of wealth from Charleston, South Carolina—then another and another, for a total of five! "He told me quite frankly that he was taking them home, adding thousands to their cost, and reselling them to his friends at a barbeque," Phil explains.

"I really feel uncomfortable dealing with wealthy people because I'm not in their class," he confides with sincere modesty. "But I do make something that fits their class. Believe me, I didn't start out that way, saying that I was going to sell to the rich folks. But it's not really boating people who buy most of my canoes. Once I realized that, and quit trying to sell to people who couldn't afford it, I did better."

Phil designed and built canoes in his mind during long months of sea duty while in the U.S. Navy. "As a submarine sonar technician, I could sit and hear nothing but whales for weeks at a time in the North Sea," he says. "So in 1997, after 13½ years in the Navy, I finally decided to get out and start building those dreams."



Above: At the shop's double router table, Phil, left, and brother Tim shape bead-and-cove strips for a canoe hull.

Left: Tim clamps a glued western red cedar strip to a canoe-in-progress. It takes about 80 strips to form a hull, each numbered and placed for appearance.

The very first canoe, however, came in 1988 while Phil was still in the service and living near Charleston where he was stationed. Remembering his boyhood years in New York's Adirondack Mountains, he wanted a canoe for recreational use on Lake Moultrie. What he wanted, though, cost too much for an enlisted man with a family.

"I told Paula, my wife, that we could build a wooden canoe for about $250," he recalls. "She said we should do it. So, together, we made a 19' strip canoe of redwood trimmed with ash and walnut and covered with fiberglass and epoxy. By the time it was finished, it cost nearly $2,000 with all the tools. Paula said I should recoup that, so I built another, planning to sell it to my Dad. But by the time it was finished, I had to go to sea. Rather than leave it outside, I put it in a consignment shop. I later heard via ship's radio that it sold for $2,000."

Phil went on to build more canoes when he wasn't at sea, each improved. By 1993, he'd won Best of Show and People's Choice awards at the Georgetown, South Carolina, Wooden Boat Exhibit. He repeated in 1995 and 1998. In 1994 and 1995, one of his canoes took the most prestigious award at *WoodenBoat* magazine's Wooden Boat Show, in New England. The exposure brought sales, too, even at the then low prices of $6,000 to $8,000.

"I was probably averaging about $1 an hour," Phil chuckles. "So I almost doubled the price." A small 1996 ad placed in *The Robb Report*, a magazine for the rich devoted to travel, luxury autos, and other pricey merchandise surprisingly brought orders. "Now, it's pretty much business by word of mouth, a few shows, and an occasional ad," he says.

His duty has become full attention to detail

How do Phil's functional objects de art differ from other wooden canoes? "I believe in the old Navy term 'attention to detail,'" he replies. "I can show you places like the scuppered [ventilated] gunwales that have no defects. You can look with a magnifying glass and you won't find anything. On the other hand, anybody can do a boat that looks good from 10' away. But when you get 3' away, flaws start showing up."

At Wood Song Canoes, detail begins with the wood. Bird's-eye and fiddleback sugar maple come from northern Michigan. Select walnut Phil buys from a furnituremaker. Clear-heart western red cedar, redwood, and Sitka spruce he gets from an Oregon supplier. Honduras mahogany, in plain, ribbon stripe, and crotch figure is shipped from North Carolina. "All in all, when you talk strips for a 20' boat, that's only 40 board feet of wood," he says. "And it takes a lot less for the gunwales, decks, seats, and other trim. So I can be picky."

Phil and his brother, Tim, rip the wood for the hulls into strips—boat length×¾×¼" for softwoods and boat length×¾×3/16" for hardwoods. The strips are numbered in pairs as they come off the board, all 80 of them. This allows Phil to "bookmatch" the hulls. That is, a strip that is No. 14 on the left (port) side has its twin in the corresponding spot on the right (starboard) side. It's pleasing to the eye.

Figured trim receives the same attention, according to Phil. "If I'm using bird's-eye maple, for instance, I place it where the most figure will be seen by the person in the boat looking at it. The carrying yoke, for example, is best seen by the stern [rear] paddler, so I face the figure to that position."

Add to that attention five coats of epoxy over the fiberglass, inside and out. Each, put on when the one before gets tacky, requires a six-hour wait, depending on air temperature. Then there's finish—seven or eight sprayed coats of Defthane exterior polyurethane on everything.

That's Phil's attention to detail, and it goes into every one of the eight or

Continued

Crafted in Carolina

A canoe's carrying yoke begins as a lamination of mahogany and bird's-eye maple. It's then cut out at a bandsaw and shaped with a grinder.

so canoes Phil and his helper can turn out annually. That's also why a boat takes from 350 to 550 hours to complete, depending on size and extras.

Model by model, it's strip after strip

Wood Song Canoes offers 16 models, each with variations that add up to 40 different hull designs ranging in length from 10' to 20'. You'll find solo canoes built for maneuverability, tandem canoes for speed, and everything in between. None of them incorporate a keel ("Modern canoe designs don't need one," notes Phil.) He doesn't build a canoe for whitewater.

"Our canoes are for special occasions when rocks and rapids aren't on the agenda," Phil comments. "They're for the time when enjoying the canoe is as meaningful as the actual trip."

Whatever the purpose or the chosen wood, every canoe requires thin strips. But unlike the strip canoes of earlier years, which required staples to hold them in place on the forms while the glue dried, Phil and Tim employ bead-and-cove joinery. "Stapleless construction adds about 40 man hours to the building time, but it eliminates the normal 6,000–10,000 holes that can be seen on the hull," Phil explains.

For bead-and-cove joining, each of the wooden strips has to be routed for a bead and a cove. This takes both men at a router table fitted with two routers. One has the beading bit, the other the cove bit. After Phil cuts one shape on one edge of a strip, he passes it to Tim to cut the other.

Phil, though, has discovered a trick to make stronger, more flexible joints with the bead-and-cove technique. "I cut the 3/16"-thick strips with 1/4" bead-and-cove router bits. This gives me a shallower cove that's stronger because it doesn't have tall walls that can chip off. The smaller bit doesn't make a full radius. To get this on 1/4" strips, I use a 5/16" bead-and-cove bit."

The adjustable bow seat of curly maple and mahogany features hand-caning in a daisy chain pattern. Several coats of exterior polyurethane protect the wood and the cane.

With the hull forms in place on the strongback, a temporary backbone for the canoe, the strips can go on. "For the strips, laminations, and everything that has what I call a factory joint, I use Titebond II," says Phil. "For something that I've hand-sanded, like the decks that have to be hand fit, I use epoxy. It fills the gaps."

When the strips have been added to the hull forms and the glue has dried, the outside gets sanded down to 400-grit. Next comes the outer layer of fiberglass.

There's many a trick to fiberglass and epoxy

"We start the fiberglassing at the warmest point of the day. And there's a reason," says Phil. "As the boat cools down, the air pockets that are inside the wood pores start to contract and draw in the epoxy with which we've saturated the fiberglass cloth. Most people do it the other way around—starting in the morning—and as the boat heats up the pores force the epoxy out." After the surface becomes tacky come the five extra coats of epoxy.

Strip-canoe builders have always had one big problem: sanding inside the hull. The outside's easy; all contours are convex. Inside, they're concave. "No sanding device fits it," Phil says. "But I've come up with a good trick.

"After fairing in [sanding] the now-hardened glass on the outside of the hull, we wiggle the very flexible hull off the form and strongback and place it right-side up in two carpet-covered cradles," he continues. "These hold the canoe at waist level and are set so that the heavy ends don't sag and draw in the hull at the gunwale line."

Now the inside of the hull is ready for sanding with a 5" random-orbit sander and two different pads. One is a standard pad and the other is one that Phil altered and calls his floppy disk. "To make a floppy disk, I take a standard-thickness 5" pad and insert its threaded bolt into my drill press," Phil explains. "With the drill press on high speed, it acts like a lathe as I file away some of the hard backing of the

Paddles that may never see water

Although Wood Song Canoes' flat-water paddles are built ergonomically so it takes little effort to move a canoe along, they're tough as well as good looking. Laminated from woods of contrasting colors, edged in ash, and reinforced with fiberglass, they'll take a beating. But like many of Phil's canoes, most paddles never see water.

"People buy them for wall decoration in restaurants, sport shops, clothing stores, and homes," says Phil. "We designed and built them for hard use, so this 'display only' aspect was exasperating at first. But then we realized that it was a form of flattery, so now we customize them and build hangers and display racks for these customers."

As well as wonderfully beautiful, Phil's paddles can feature bent shafts, modified pear-shape grips, and S-blades. For lightness, but less beauty, Wood Song makes them of redwood or western red cedar. Hardwood paddles offer more eye appeal, but they're heavier. The base price for either in adult size is $225, with added charges for figured wood, fancy patterns, or special blades.

pad. I generally stop when the pad becomes 2¾" to 2" in diameter. At that point it can handle sanding all but the smallest radius.

"For the very tight curves in the ends of the canoe's bottom, I sand with a rubber 1½"- to 2"-diameter drum and sanding sleeve. In the extreme ends, which will later be covered by bulkheads, I use cloth-backed 40-60 grit paper."

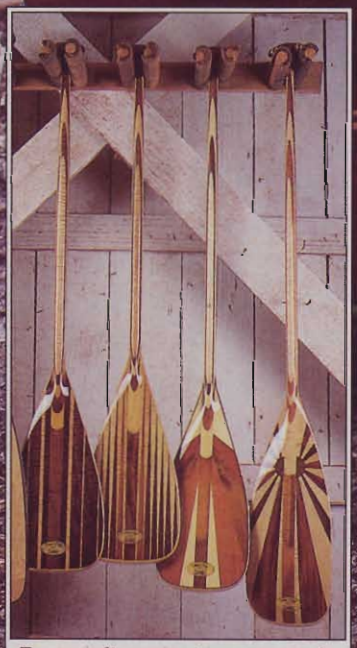
The inside gets sanded first with 40 grit for soft woods or 60 grit for hardwoods. Phil and Tim don't bother scraping off the glue, as the course grit readily handles the non-gumming Tite-bond II. After the first sanding, which removes squeeze-out, the pair switches to other grits and ends up with 280 grit for softwood hulls or 400 grit for hardwoods.

The figured, matched wood, the details, the coats of epoxy and polyurethane, all add up to the beauty that people just love to touch. Pointing to the gleaming 19' tandem boat before him, Phil says, "This canoe has been fondled by perhaps 250,000 people at different shows. And I can tell by how they run their hands over it that our Wood Song Canoes have hit the right chord."

Want to get canoe savvy?

Phil has written a real gem of a booklet on choosing a canoe and paddles, canoe design, and basic canoe and paddle construction. You can get it for $8 (U.S.) by writing Wood Song Canoes, 425 Jessie Lane, Round O, SC 29474. Phone 843/835-8137.

Written by Peter J. Stephano
Photographs: Steve Uzzell



From left, walnut/curly maple Black Beauty paddle, $270; walnut/curly maple Salt and Pepper paddle, $270; redwood, western red cedar, and spruce Spectrum paddle, $270; curly maple, walnut, and mahogany Sunrise paddle, $390.

A laminated red cedar paddle with maple accents leans against a canoe with a sculpted, crotch mahogany deck.

Nesting Knockouts

A matched set of mission-style tables

You can treat the trio as three separate tables, as shown *above*, or nest them, as shown at *right*.

You can't beat nesting tables for versatility and beauty. We've made these three even more appealing by designing them to go together with minimum fuss and maximum workshop enjoyment.

Note: *Although the tables are different sizes, the methods for making the parts for each one are identical. So we suggest you machine parts for all three tables at the same time. That way, you'll only have to make each setup once.*

You'll need a dozen legs

1 Laminate stock for the legs (A) , and cut them to the sizes shown for each table in the Bill of Materials. To do this, laminate two pieces of ¾"-thick×1¾"-wide white oak about 1" longer than the finished length of each leg. Joint one edge of each lamination, and rip the piece to 1⁹⁄₁₆" wide. Joint the sawn edge to finished width, and trim the leg to length.

2 Mark each leg's location, such as *right rear*, on its top. Orient the lamination lines as shown in the Exploded View drawings.

3 Lay out the mortises on the legs, referring to the Exploded View drawings and the Mortise detail of the Right Leg Assembly drawing. Stand the legs for each table in assembly order to verify the mortise layouts.

4 Form the leg mortises. To do this, refer to steps 2–4 in the Forming a Mortise illustration. For accuracy, drill the holes with a drill press, setting a fence to center the bit on the leg.

5 Rout or sand ⅛" chamfers at the bottom of each leg where shown.

Now get rollin' on the rails

1 Cut the rails (B) to size for each table. At the same time, cut two or three scrapwood test rails (small-table size would be fine).

2 Cut ⅜×1¼" tenons 1⁵⁄₁₆" long on the rail ends, where shown in the Tenon detail of the Right Leg Assembly (large table) drawing. Later you'll miter-cut

the tenons to give them the shape shown in the drawing.

To cut the tenons, install a ¾" dado blade on your tablesaw. Position the tablesaw's rip fence 3/16" from the dado blade, as shown in the Cutting the Rail Tenons drawing. Attach an auxiliary fence to the saw's miter gauge, extending it to the rip fence, as shown in the drawing.

Set the cutting depth to 3/16", and cut both faces at one end of a test rail, holding the end against the rip fence. Make another pass with the end

Continued

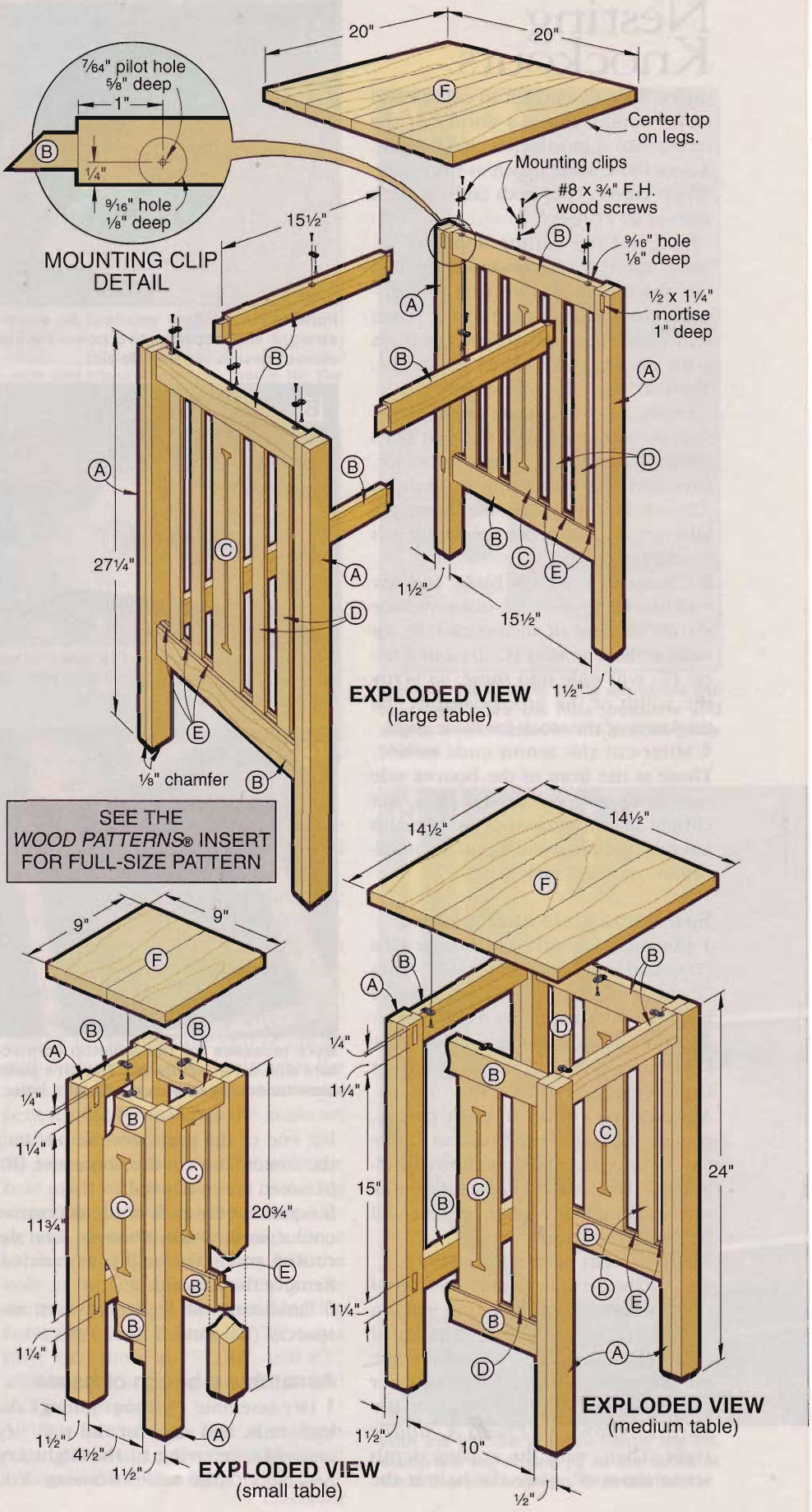
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
large table					
A* leg	1½"	1½"	27¼"	LO	4
B rail	¾"	2"	17⅜"	O	7
C wide slat	¼"	3"	18¼"	O	2
D narrow slat	¼"	1¼"	18¼"	O	8
E filler	¼"	⅝"	1¼"	O	24
F top	¾"	20"	20"	EO	1
medium table					
A* leg	1½"	1½"	24"	LO	4
B rail	¾"	2"	11⅞"	O	7
C wide slat	¼"	3"	15"	O	2
D narrow slat	¼"	1¼"	15"	O	4
E filler	¼"	⅝"	1⅛"	O	16
F top	¾"	14½"	14½"	EO	1
small table					
A* leg	1½"	1½"	20¾"	LO	4
B rail	¾"	2"	6⅜"	O	7
C wide slat	¼"	3"	11¾"	O	2
D narrow slat	not used in this table				
E filler	¼"	⅝"	1/16"	O	8
F top	¾"	9"	9"	EO	1

*Make oversize initially, then cut to finished size in accordance with how-to instructions.

Materials Key: O–white oak; EO–edge-glued white oak; LO–laminated white oak.

Supplies: Tabletop fasteners, #8x¾" flathead wood screws.



Nesting Knockouts

pulled back far enough to cut the end of the tenon. Insert a corner of the tenon into a mortise to check its fit. Adjust the cutting depth as necessary. When correct, cut both faces at both ends of all 21 rails.

Next, set the cutting depth at ¼". Stand the test rail on one edge, and cut the tenon. Ensure that this distance from the rail edge to the tenon will place the rail's top edge flush with the leg top. Adjust if needed. Then cut one edge of each rail end.

Finally, set the cutting depth at ½". Saw the other edge of the test rail's tenon. Test-fit and adjust as before, then cut the remaining rail edges. After making the last cuts, leave the tablesaw cutting depth set where it is for the next step.

3 Change to a ¼" dado blade, and saw a centered groove ½" deep, where shown on four of the seven rails for each table. The slats (C, D) and spacers (E) will slide into these, so verify the width of the groove against the thickness of the stock for those parts.

4 Miter-cut the tenon ends to 45°. Those at the front of the bottom side rails don't require mitered ends. But cutting all of them makes the side rails interchangeable, heading off a complication come assembly time.

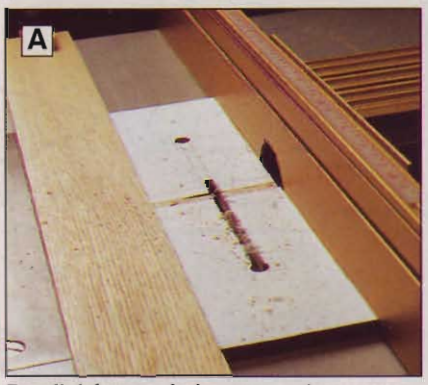
Saw some slats and spacers

1 Cut the wide slats (C), narrow slats (D), and spacers (E) to size from ¼"-thick stock. Note that the small table doesn't call for any narrow slats.

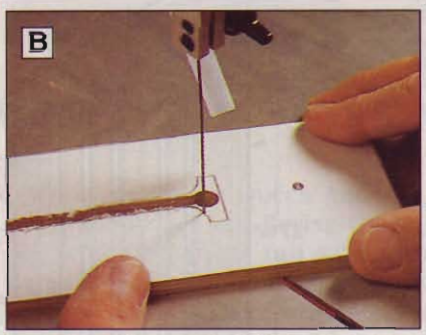
2 Make 12 photocopies of the Decorative Cutout Full-Size Pattern in the *WOOD PATTERNS®* insert. Adhere two copies to each part C, placing the top of each pattern at one end of the part. Spray adhesive (follow the label instructions for temporary bonding) or rubber cement will hold them in place.

3 Drill ⅜" start holes where shown.

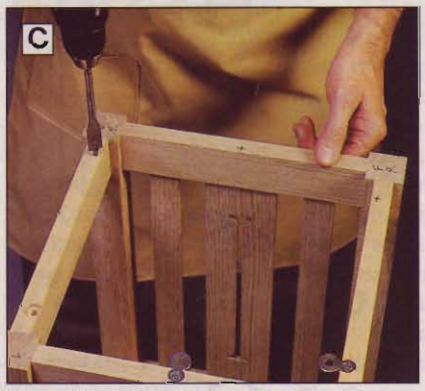
4 Rout the straight center portion of the cut-out design. To do this, install a ¼" straight bit in your table-mounted router. Position a fence to center the bit on the wide slat. Clamp another fence along the other edge of the part, as shown in *Photo A, above right*. Then, with the cutting depth set to about ⅜", place the hole at the left end of the part over the bit, start the router, and cut the decorative slot between the two holes.



Parallel fences help you rout an arrow-straight slot between two holes for the cut-out design in the wide slat.



Scrollsaw the ends of the decorative cutout. A #4 blade (.035×.015", with 18 teeth per inch) is a good choice.



Bore recesses for the tabletop connectors with a 9/16" spade bit. The bit's point simultaneously drills a screw pilot hole.

5 Scrollsaw the ends of the decorative cutout, as shown in *Photo B*. Sand the routed and sawn edges, as needed. Remove the patterns.

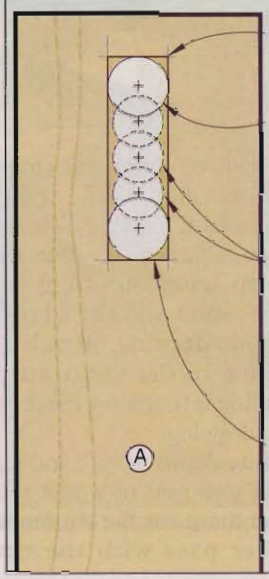
6 Finish-sand the legs, rails, slats, and spacers. (We sanded to 220 grit.)

Assemble a bunch of bases

1 Dry-assemble (without gluing) the legs, rails, and slats for the right leg assembly, referring to the Right Leg Assembly (large table) drawing. You can leave out the spacers (E) for this test-fitting. Check for joint fit and squareness, and ensure that the top of the rail lies flush with the leg tops. Unclamp the parts, and disassemble.

2 Glue together the rails and slats for the assembly. To do so, start by placing the center slat exactly in the middle of one rail. Put a dab of glue in the groove on each side of the slat, and slip a spacer into the groove against each edge of the slat. Center the other rail on the other end of the slat, and glue in the spacers. Slide in the first narrow slat, and fix it in place with

FORMING A MORTISE



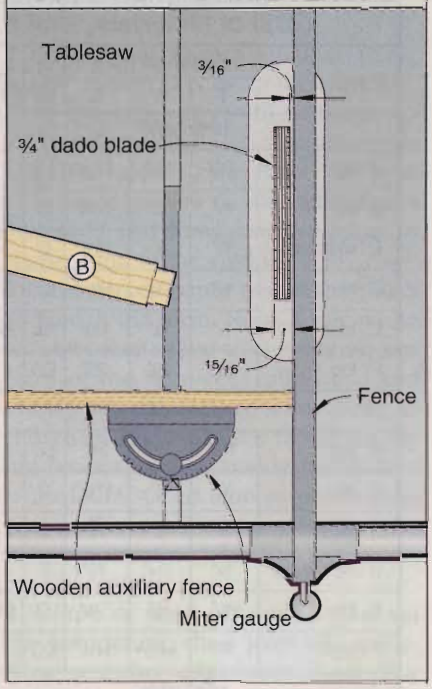
STEP 1
Mark mortise location on leg.

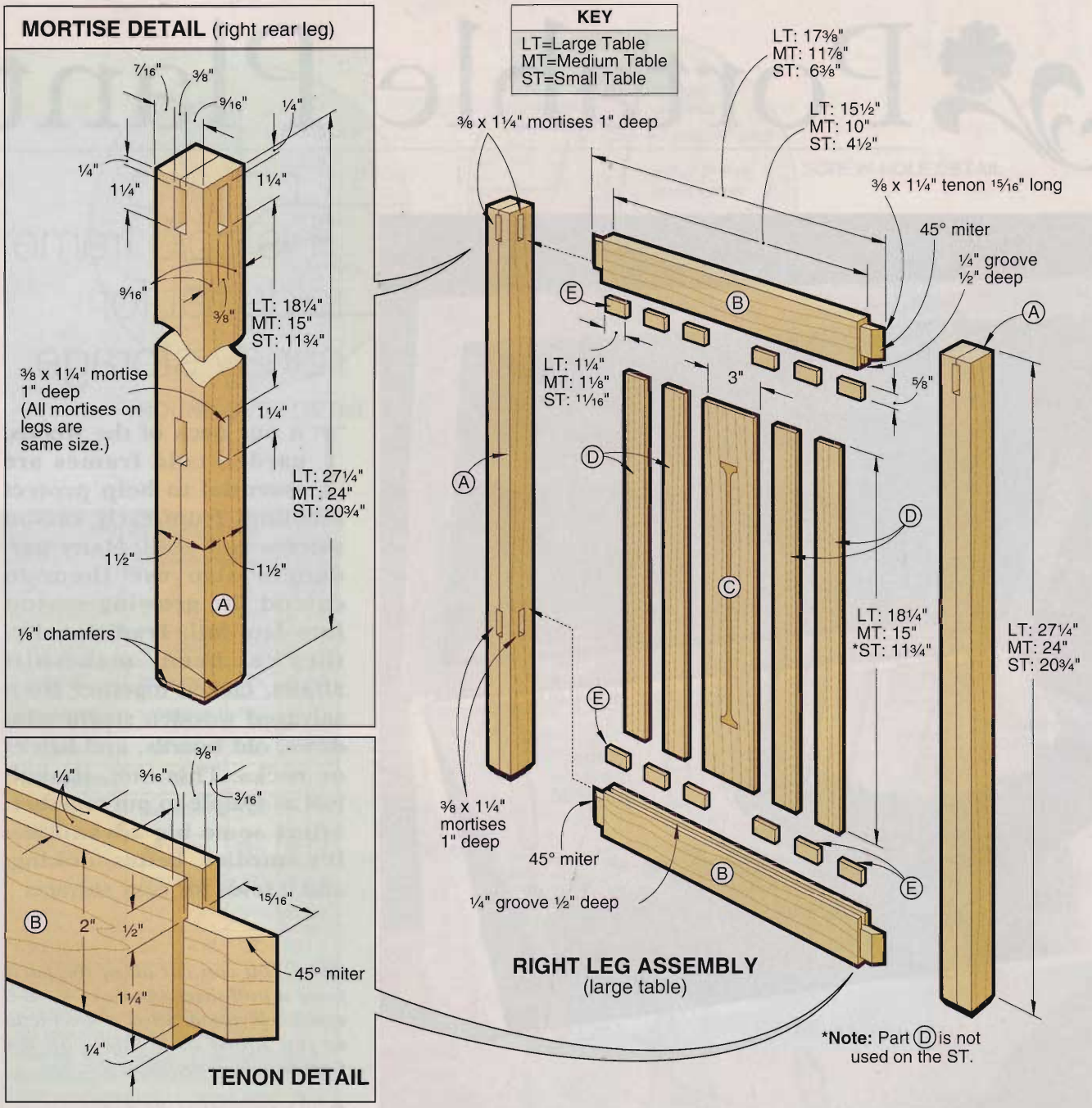
STEP 2
Drill ⅜" holes 1" deep at both ends of mortise.

STEP 3
Drill overlapping 5/16" holes 1" deep between holes drilled in Step 2.

STEP 4
Finish mortise with a chisel, cutting sides and ends square.

CUTTING THE RAIL TENONS





spacers. Continue until all slats and spacers are in place.

3 After the glue dries, glue the front and back legs to the assembled rails and slats.

4 Put together the left leg assembly in the same way. Build the left and right leg assemblies for the other tables.

The leg assemblies for the other tables differ from the drawing only in the number of narrow slats (D). The medium table has two narrow slats per assembly; the small table, none.

5 Connect the leg assemblies for each table with the remaining rails, referring to the Exploded View drawing. To ensure wobble-free tables, assemble them on a known flat surface, such as your tablesaw's table.

This tops everything so far

1 For each table, edge-glue stock to make a blank slightly larger than the top, and cut the top (F) to size.

2 Install figure-eight type tabletop connectors on each frame assembly, where indicated on the Exploded View drawings. Locate the center of the 9/16" hole for each connector 1/4" from the inside edge on top of the rail. Drill the holes with a portable drill, as shown in *Photo C*.

3 Lay the top facedown on the workbench, and center the inverted base assembly on it. Mark centers for the attaching screws. Drill pilot holes, taking care not to go through the top. Attach the top with screws.

4 Finish-sand the top. Finish the set as desired. (We stained the tables shown with Minwax provincial #211, then applied satin-finish polyurethane.)

Project Design: Jim Boelling; James R. Downing
Photographs: Hetherington Photography
Illustrations: Kim Downing; Lorna Johnson

Portable Plant

This cold frame folds flat for handy storage

In our neck of the woods, garden cold frames are essential to help protect seedlings from early season storms and chill. Many gardeners also use them to extend the growing season into late fall. Traditionally, they've been makeshift affairs, tacked together from salvaged wooden storm windows, old boards, and bricks or rocks. This one, though just as simple to put together, offers some big advantages: It's sturdier, better-looking, and it folds for easy storage.

Note: *You can cut all of the parts from a half-sheet (4×4') of ¾" B-C exterior plywood. Select a sheet with as few knots as possible on the C-grade side. It should lie flat, too.*

Saw seven plywood pieces

1 Referring to the Cutting Diagram, rip a 7¾"-wide strip for the front panel (A) from one edge of a 4×4' piece of plywood. Crosscut to the length specified for part A in the Bill of Materials.

2 Cut part B to size. Rip and crosscut the remaining piece of plywood to 28×39¼" (the outside dimensions for part C); then lay out on it the inside cutting line for part C .

3 Draw cutting lines for parts D and E in the middle of the laid-out lid (C), where shown on the diagram. (We laid out the parts using a metal yardstick and a fine-point black marker.)

Protection

4 Drill a ¼" blade start hole adjacent to the cutting line for the lid opening. Lay the plywood across a pair of sawhorses or other suitable supports, and cut out the lid opening with a handheld jigsaw, as shown in the photo *below*.

5 Cut parts D and E to shape.

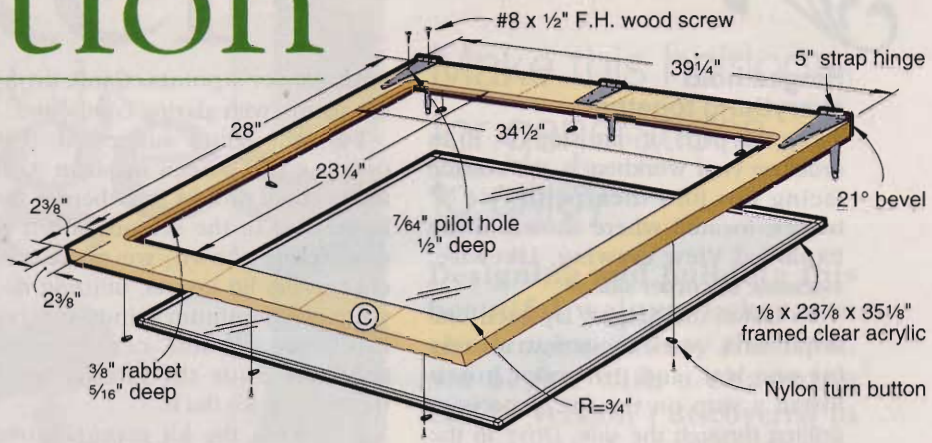
6 Tilt your tablesaw's blade to 21°, and bevel-cut the top of the front panel (A) and back panel (B), where shown on the Exploded View and Side Section View drawings.

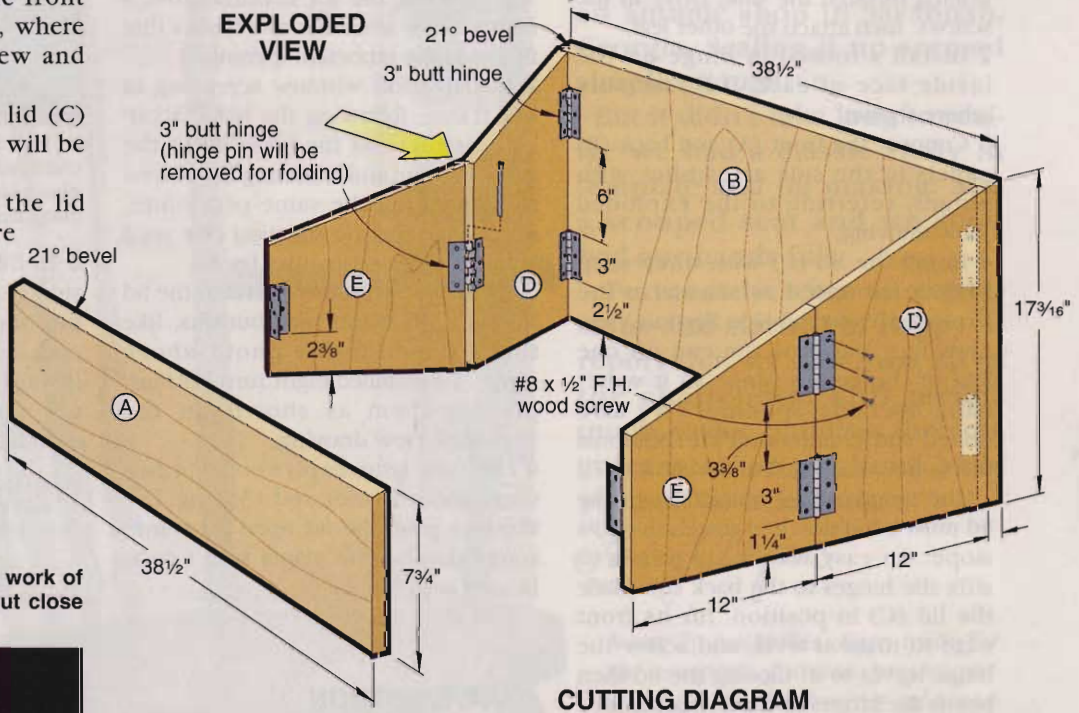
7 Bevel-cut the back of the lid (C) where shown. The long side will be the outside surface of the lid.

8 Rout a ⅜" rabbet around the lid opening on the inside where shown. Chisel the rabbet's corners square.

9 Fill any voids that appear in the sawn and routed plywood edges. (We used Durham's Rock Hard water putty as a filler.) Sand the parts smooth.

Continued





A handheld jigsaw makes quick work of cutting out parts C, D, and E. Cut close to the line; then sand to it.

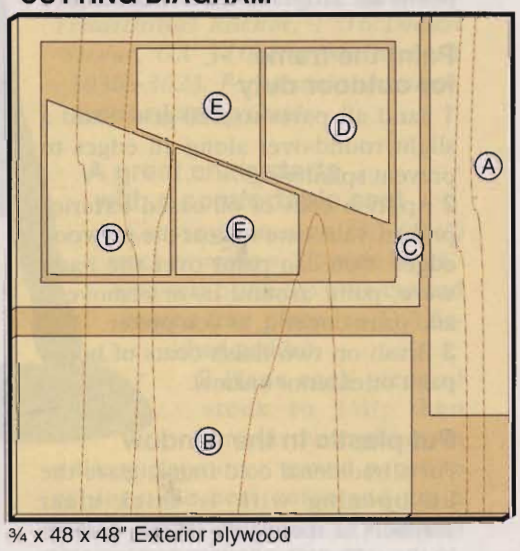
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A front panel	¾"	7¾"	38½"	Ply	1
B back panel	¾"	17¾16"	38½"	Ply	1
C lid	¾"	39¼"	28"	Ply	1
D side panel	¾"	12"	16⅞"	Ply	2
E side panel	¾"	12"	12⅝16"	Ply	2

Material Key: Ply–grade B-C exterior plywood.

Supplies: 5" light strap hinges (3), National N127-605; 3" non-removable pin hinges (10), National N146-373; 3" loose-pin hinges (2), National N227-207; aluminum screen-frame kit; nylon turn buttons (8), Elgar 00081; 2-mil clear plastic; nylon window screen (optional); paint.

CUTTING DIAGRAM



¾ x 48 x 48" Exterior plywood

Portable Plant Protection

Hinges hold everything together

1 Lay the parts of one side (D, E) in order on your workbench, the outside facing up. Join them with two 3" hinges, located where shown in the Exploded View drawing. Likewise, assemble the other side.

To install the hinges, lay each one in position. Mark the screw centers for one leaf, and drill pilot holes. Install a stop on the bit to prevent drilling through the side. Drive in the screws; then attach the other leaf.

2 Install a loose-pin hinge on the inside face of each D-E assembly where shown.

3 Connect the front (A) and back (B) panels to the side assemblies with hinges, referring to the Exploded View drawing.

4 Install the lid (C) with three strap hinges, mounted as shown in the Exploded View and Side Section View drawings. Hacksaw the end off one leaf of the center hinge so it won't hang over the opening. (We also drilled and countersank an additional screw hole near the cut-off end.)

The hinge leaves that attach to the lid must bend down to match the lid's slope. An easy way to do this is to affix the hinges to the back (B), place the lid (C) in position, lift its front edge to make it level, and screw the hinge leaves to it. Closing the lid then bends the hinges to the correct angle.

Paint the frame for outdoor duty

1 Sand all parts to 220-grit. Sand a slight round-over along all edges to prevent splintering.

2 Apply a coat of oil-based exterior primer. Take care to coat the plywood edges. You can paint over the hardware, paint around it, or remove it and paint under it, as you prefer.

3 Brush on two finish coats of house paint or exterior enamel.

Put plastic in the window

For a traditional cold frame, glaze the lid opening with ⅛"-thick clear acrylic. Cut the plastic to size, place it in the rabbeted opening, and secure it with glazier's points. Caulk around the plastic with glazing compound.

But, one editor suggested, if the opening had screen mesh in it, the frame could protect strawberries from birds later in the season. So for the cold frame shown, we made interchangeable lid inserts, utilizing do-it-yourself aluminum window screen kits from a home center. (Elgar Products made the kits we used.) Here's how we did it.

1 Following the kit manufacturer's instructions, assemble two frames that fit inside the rabbeted opening.

2 Install nylon window screening in one frame, following the manufacturer's instructions for pressing in the rubber spline and trimming the screen to size. Using the same procedure, install clear plastic sheeting (we used 2-mil plastic) in the other frame.

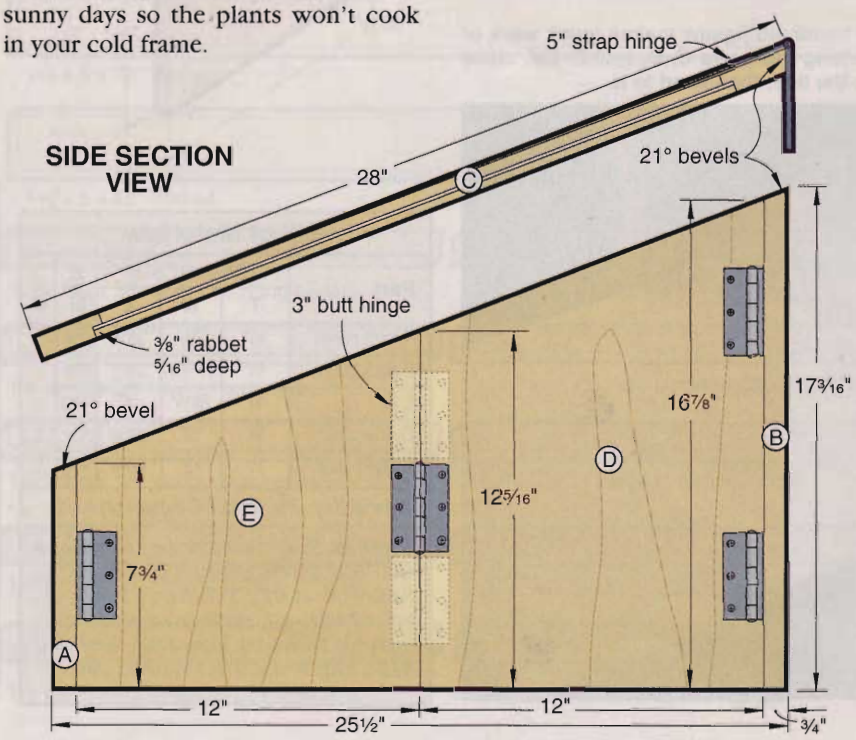
3 Secure the window inserts in the lid rabbet with nylon turn buttons, like those shown in the photo *above right*. We installed eight turn buttons, placing them as shown on the Exploded View drawing.

4 From the leftover plywood, cut two sticks about 1" wide and 13" long. Use these to prop the lid open on warm, sunny days so the plants won't cook in your cold frame.

Nylon turn buttons hold the interchangeable inserts in the lid. You can also glaze the lid directly with a piece of clear acrylic sheet.

5 To fold the cold frame for off-season storage, pull the pins from the loose-pin hinges on the sides. Flip the lid over against the back. Fold the sides inward to collapse the frame. Stick the hinge pins back in one leaf of each hinge for safekeeping.

Project Design: Bruce Chambers; Charles I. Hedlund
Illustrations: Roxanne LeMoine; Lorna Johnson
Photographs: Hetherington Photography



Rocker of the Ages

Make this heirloom for generations to enjoy

Designing and building this beautiful walnut rocker was challenging, to say the least. We began with a charming child's version I discovered in an antique shop in Savannah, Georgia. Scaling it up seemed simple enough.

But it didn't take long to realize we had a classic study in template and jig making. Add a scooped seat and we soon had our hands full.

Fortunately, after numerous stops and starts, I'm happy to report that we've solved all of the challenges. This means much easier building for you, guaranteed! So go ahead, build yourself an heirloom.

Larry Clayton
Editor

Note: *To build this chair, write for the complete, full-size, project patterns at the following address: Traditional Rocker, 1716 Locust Street, GA 310 Des Moines, IA 50309-3023. For a walnut source, see our Buying Guide.*

A great chair starts with a comfortable seat

1 Crosscut enough 6/4 (1⅜") stock to make a 22"-wide by 21"-long seat blank (A). (We cut and jointed four pieces to 5½" finished width.)

2 Plane each piece of stock to 1¼"; then arrange these pieces on a flat surface over waxed paper to achieve the best color and grain match. Mark the pieces to maintain this order during the glue-up.

Continued

Rocker

3 Glue up the blank, leaving the clamps on overnight. Next, crosscut both ends to square the blank, establishing a finished length of 20¾".

4 Apply the full-size patterns for the seat top and bottom from the mail-order pattern pack. (See *Photo A*.) Be sure to run the grain from front to back. Align the patterns' front edges with the front edges of the seat blank. Ensure that the top and bottom patterns align perfectly. (We penciled a centerline across the front edge of the seat blank and aligned the patterns' centerlines with this line.)

Bore precision holes in the seat with our handy jig

Note: *Success in drillng the seat and other chair parts requires a close and careful reading of the patterns.*

1 Complete the seat work by boring precision angled holes in the seat top and bottom. To do this, first build the drill-press angle jig on *page 60*.

2 Chuck a ¾" brad-point bit into your drill press, and check to see that the table sits perpendicular to the bit. Place the jig on the table, locating it hinge-end out with the centerline beneath the bit. To do this, lay the column-alignment gauge along a centerline marked on the jig and against the drill-press column as shown on *page 56* in *Photo B*. Bolt or clamp the table in place.

3 Next, as shown *Photo C*, adjust the angle of the table for 77° for the ¾" rear leg holes drilled into the seat bottom. Tighten the jig's knobs to lock the angle in place.

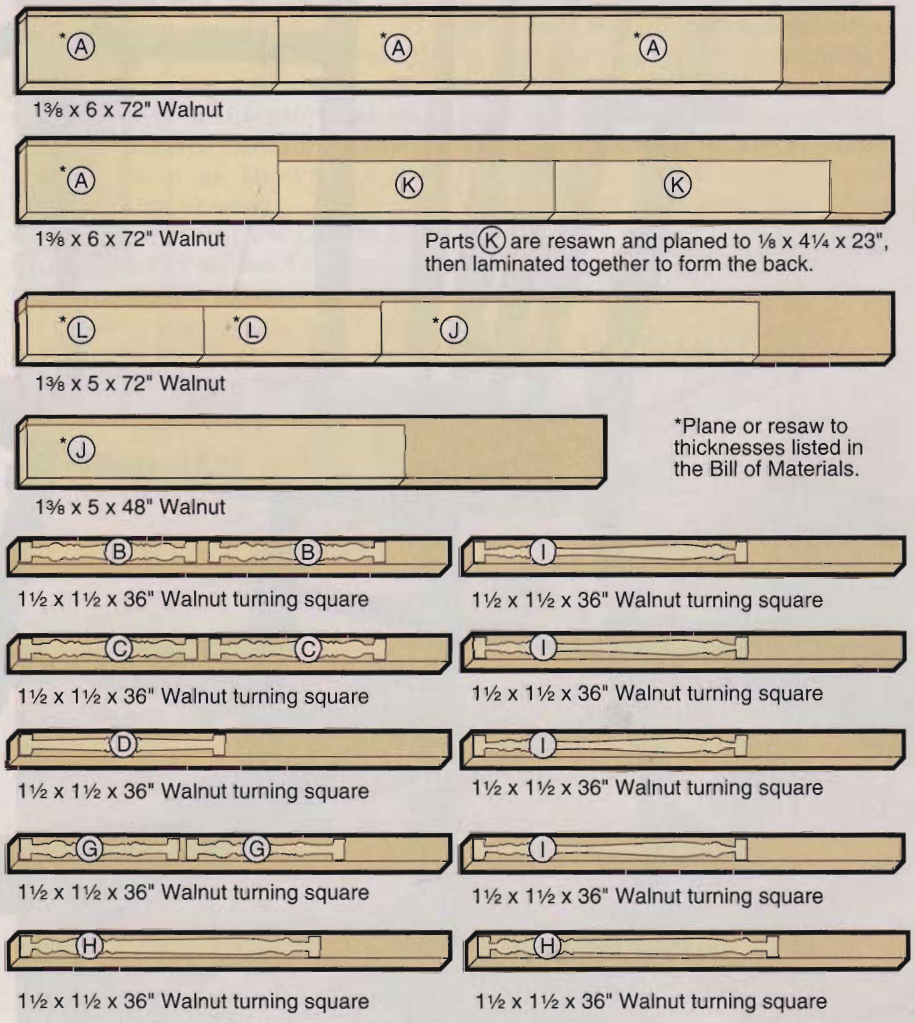
4 Tack the alignment gauge temporarily in place along the dashed alignment line for the 77°, ¾" hole. Place the seat blank on the jig with the hole location centered under the drill bit. Ensure that the column alignment gauge contacts the column as shown in *Photo D*. Drill the hole to the prescribed depth. (We used masking tape wrapped around the drill bit for a depth gauge.) Repeat the drilling process for the remaining 77°, ¾" hole.

Adjust the table to 81°, and drill the remaining ¾" holes on the bottom. Flip the seat blank over, and drill the

Continued

Center and align the top and bottom patterns along the front edge of the seat blank. Tape them in place at the centerline edges; then spray-adhere them to the seat as shown, smoothing out any wrinkles.

CUTTING DIAGRAM


*A
*A
*A
1⅜ x 6 x 72" Walnut
*A
K
K
1⅜ x 6 x 72" Walnut
Parts K are resawn and planed to ⅛ x 4¼ x 23", then laminated together to form the back.
*L
*L
*J
1⅜ x 5 x 72" Walnut
*J
1⅜ x 5 x 48" Walnut
*Plane or resaw to thicknesses listed in the Bill of Materials.
B
B
1½ x 1½ x 36" Walnut turning square
I
1½ x 1½ x 36" Walnut turning square
C
C
1½ x 1½ x 36" Walnut turning square
I
1½ x 1½ x 36" Walnut turning square
D
1½ x 1½ x 36" Walnut turning square
I
1½ x 1½ x 36" Walnut turning square
G
G
1½ x 1½ x 36" Walnut turning square
I
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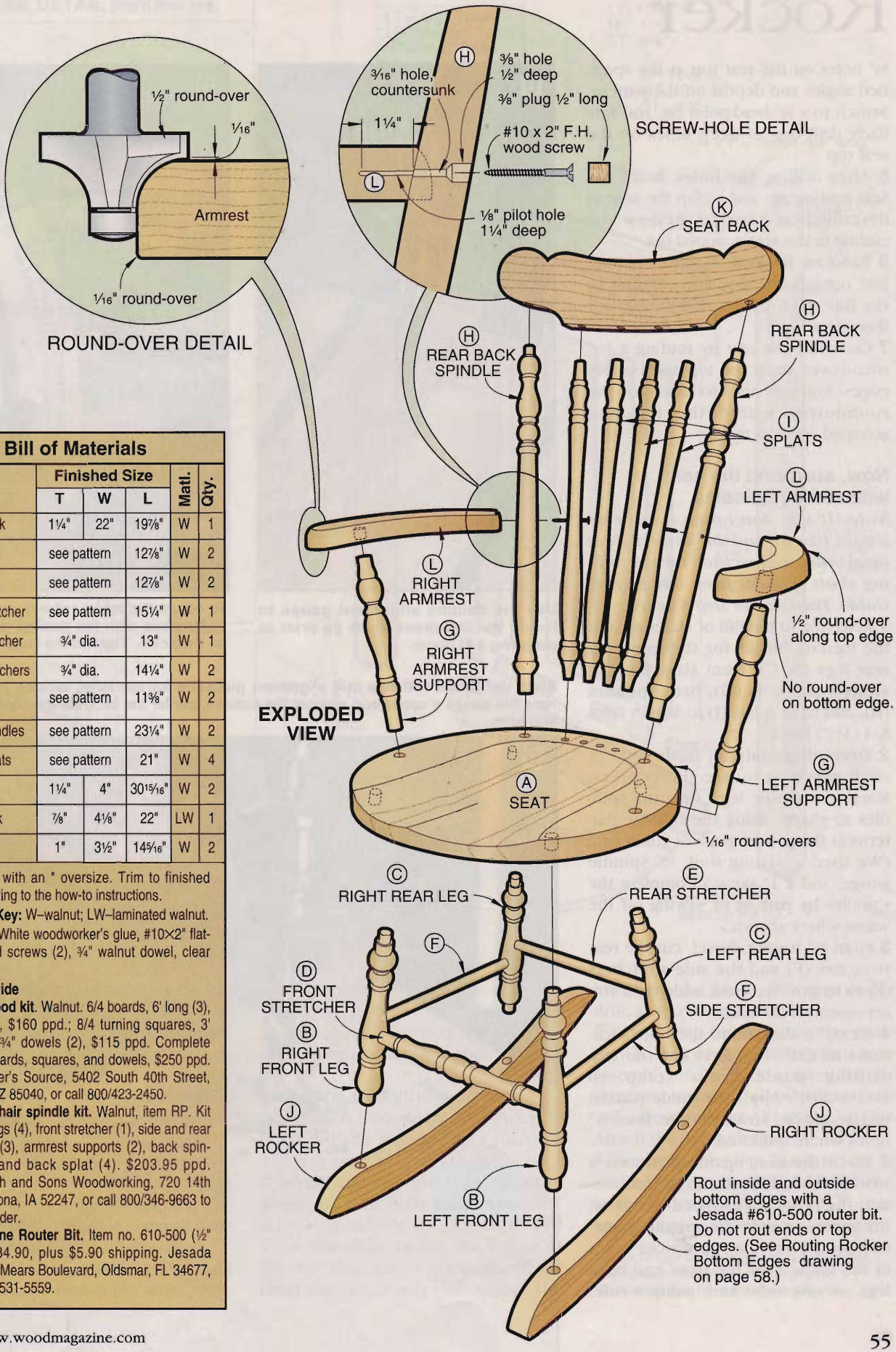
H
1½ x 1½ x 36" Walnut turning square
H
1½ x 1½ x 36" Walnut turning square



Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
*A seat blank	1¼"	22"	19⅞"	W	1
B front legs	see pattern		12⅞"	W	2
C rear legs	see pattern		12⅞"	W	2
D front stretcher	see pattern		15¼"	W	1
E rear stretcher	¾" dia.		13"	W	1
F side stretchers	¾" dia.		14¼"	W	2
G armrest supports	see pattern		11⅜"	W	2
H back spindles	see pattern		23¼"	W	2
I back splats	see pattern		21"	W	4
*J rockers	1¼"	4"	30 15/16"	W	2
*K seat back	⅞"	4⅛"	22"	LW	1
*L armrests	1"	3½"	14 5/16"	W	2

*Cut parts with an * oversize. Trim to finished size according to the how-to instructions.

Materials Key: W–walnut; LW–laminated walnut.

Supplies: White woodworker's glue, #10×2" flat-head wood screws (2), ¾" walnut dowel, clear finish.

Buying Guide

Rocker wood kit. Walnut. 6/4 boards, 6' long (3), 4' long (1), $160 ppd.; 8/4 turning squares, 3' long (10), ¾" dowels (2), $115 ppd. Complete order of boards, squares, and dowels, $250 ppd. Woodworker's Source, 5402 South 40th Street, Phoenix, AZ 85040, or call 800/423-2450.

Rocking chair spindle kit. Walnut, item RP. Kit includes legs (4), front stretcher (1), side and rear stretchers (3), armrest supports (2), back spindles (2), and back splat (4). $203.95 ppd. Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247, or call 800/346-9663 to place an order.

Queen Anne Router Bit. Item no. 610-500 (½" shank), $34.90, plus $5.90 shipping. Jesada Tools, 310 Mears Boulevard, Oldsmar, FL 34677, or call 800/531-5559.

Rocker

¾" holes on the seat top at the specified angles and depths on the pattern. Switch to a ½" brad-point bit, and similarly drill the ½" deep holes on the seat top.

5 After drilling the holes, build the seat routing jig, and scoop the seat as described on *page 10*. Redraw the cutline in the area scooped out.

6 Bandsaw the seat to shape, cutting just outside the line and sanding to the line. (We used a disc sander for this operation.)

7 Complete the seat by routing a 1/16" round-over along the top and bottom edges. You may need to hand-sand the round-over where the flat and scooped surfaces meet.

Now, surround the seat with sturdy spindles

Note: *If you don't own a lathe or would like to save on construction time, order the precision-turned rocking chair spindles from our Buying Guide. Then skip to Step 3* below.

1 Referring to the Bill of Materials, cut the turning blanks for the front and rear legs (B, C), front stretcher (D) armrest supports (G), back spindles (H), and back splats (I) to length from 8/4 (1½") stock.

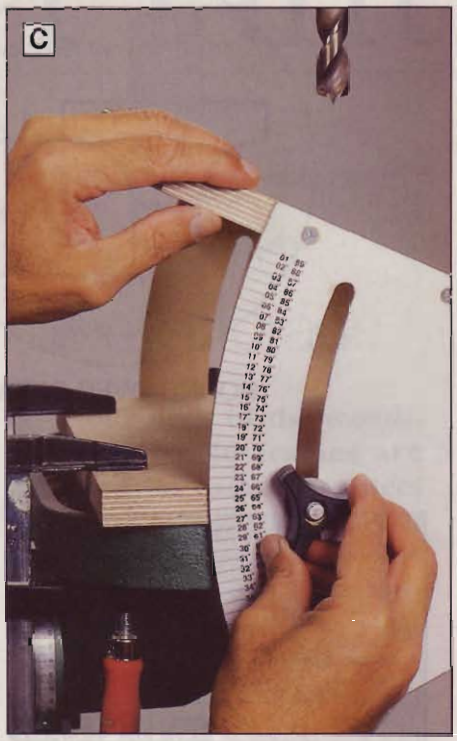
2 Draw diagonals on both ends of each piece to locate the centers. Starting with the legs, turn the spindles to shape, using the full-size patterns in the pattern pack to guide you. (We used a parting tool, ½" spindle gouge, and a 1" skew.) Complete the spindles by parting or sawing off the waste where shown.

3 From ¾" walnut dowel, cut the rear stretcher (E) and the side stretchers (F) to length. Set these aside until you dry-assemble the base.

4 Next, to determine the hole locations in each leg, first cut the leg-drilling guide from scrap to ¼×1½×20½". Apply the guide pattern to the piece, and drill the four ¾" holes where indicated.

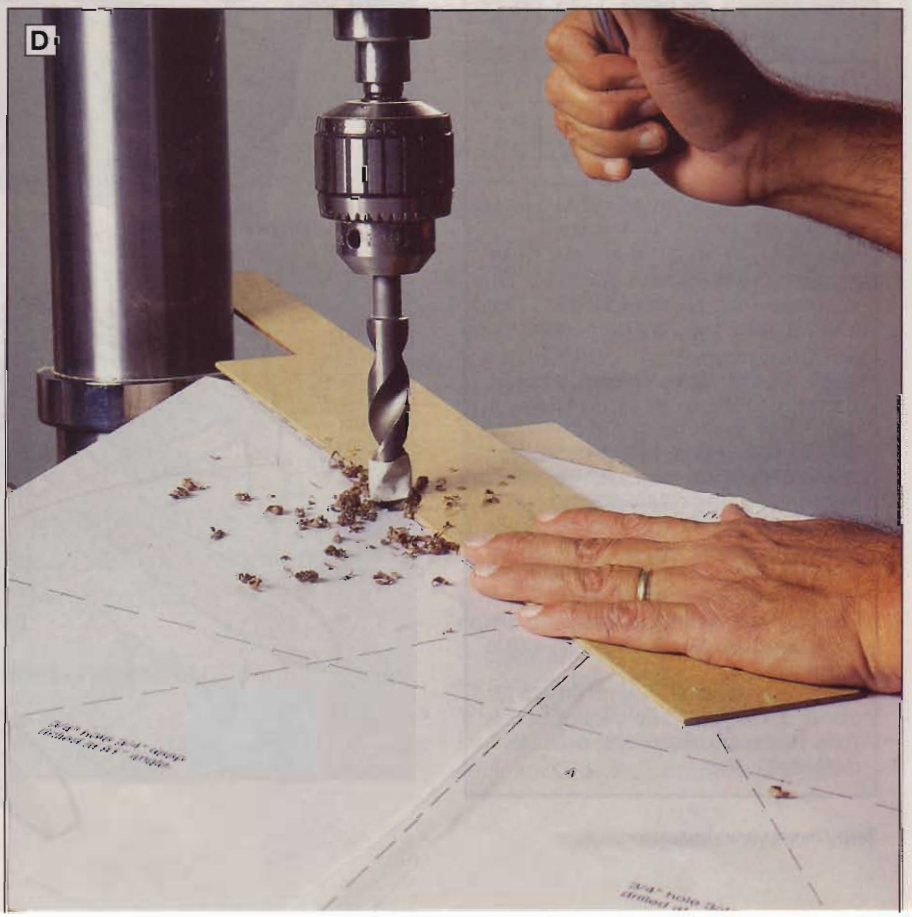
5 Place the seat upside down on a worktable, and dry-fit the leg spindles into the holes. (We sanded bevels on the tenons to make the spindles easier to insert.) Place the appropriate holes in the guide over the front and back legs on one side, and, using a rule,

Use the column alignment gauge to locate the drill-press angle jig prior to clamping it in place.



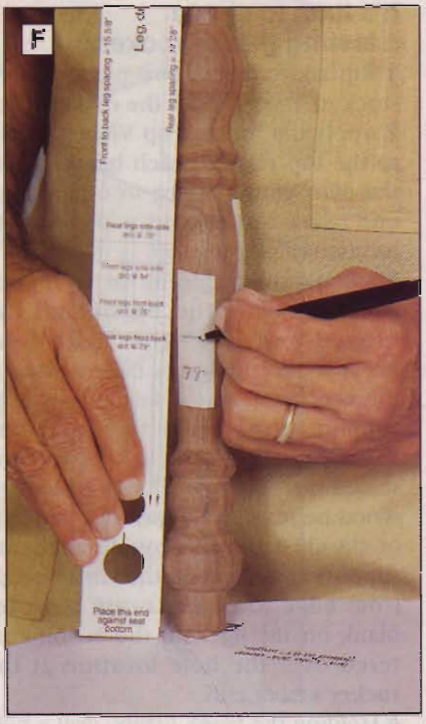
To adjust the table, raise it, aligning the top surface with the needed degree line on the scale. Tighten the knobs.

Align the gauge with the drill alignment guideline for the hole, tacking it in place. Hold the gauge's upper end against the column, center the bit over the hole location, and bore.



Place the guide over the bottom ends of the legs and make alignment marks for the drilling operation.

Align the appropriate mark on the leg's bottom end with the jig's vertical line, and clamp the opposite end in place.



Hold the leg-drilling guide alongside the legs, and mark the hole locations and angles where noted on the printed guide pattern.

With the spindle in place below the bit, clamp the leg-drilling jig to the fence of the drill-press angle jig. Bore the hole.

mark a ¼" line onto the ends of each leg, continuing the pattern line as shown in *Photo E*. Repeat for the opposite front and back legs. Then relocate the guide over the front legs only and, again, over the back legs, marking the leg ends where indicated.

6 Now, run strips of masking tape up the inside surfaces of the legs. Rest the guide on the chair bottom, and mark the hole locations, as shown in *Photo F* and where referenced for front stretcher (D), rear stretcher (E), and side stretchers (F). (To avoid confusion later on, we marked the legs and corresponding leg holes 1, 2, 3, and 4. As a quick reference, we also marked the angle of each drill hole beside each mark.)

7 Next, make the simple leg-drilling jig in the pattern pack. Strike a vertical centerline on the jig's solid end.

8 Secure the drill-press angle jig, hinge end out, to your drill-press table and adjust it to 75°. Then place the jig's fence and the leg-drilling jig on the drill-press angle jig, securing the fence to the track and centering the leg-drilling jig on the angle jig's centerline. Measure between the two and cut a spacer to that width.

9 Insert a marked spindle leg into the leg-drilling jig, aligning the appropriate mark on the leg's bottom end with the vertical mark on the outside face of the jig at one end, as shown in *Photo G*. Clamp the top end of the spindle in the opposite end of the jig with a small C-clamp. Ensure that the angle next to your hole location mark beneath the bit matches the angle set in the drill-press angle jig.

10 Now, centering a ¾" bit over the hole mark with the top end of the leg nearest to the drill column, clamp this jig with spacer to the angle-jig's fence as shown in *Photo H*. Then drill the hole in the leg. Use this same procedure to drill all of the remaining leg holes. (We drilled all of the 75° holes first; then those at 79°, 84°, and 87°, adjusting the angle jig accordingly and locking it in place.)

11 Dry-fit the legs and stretchers together and to the seat bottom. Leave these in place for now.

Continued

Rocker

It's time to shape a lasting pair of rockers

1 Rip and crosscut two pieces of 6/4 stock to 4⅜×31½" for the rockers (J).

2 Apply the rocker Top View patterns to the top edge of each blank. Apply the Side View pattern to one side of one blank and aligned with the hole locations along the top.

3 Clamp the angle jig to your drill press rotating the jig so that the hinged end is to the right side. Because the drill-press table arm is in the way, remove the inside triangular support of the jig for this operation. Raise the jig to 76° and lock the one scaled side in place. Clamp a block of wood beneath the opposite open side of the jig table to provide adequate support and maintain the table's angle from edge to edge. Locate a rocker blank on the jig with the ¾" bit centered over the hole location at the rocker's front end.

4 Holding the blank firmly, drill a hole 1½" deep. Drill a front-end hole in the other rocker blank.

5 Adjust the angle jig to 85°, adjust the block of wood as needed, turn the rocker blanks 180° on the jig, and drill the 2½" holes at the rear ends of the rocker blanks.

6 With the ends flush and the holes aligned, join the two pieces together with double-faced tape. Now, bandsaw the rockers to shape following the pattern. Separate the rockers and label one "left" and one "right."

7 Next, chuck a slightly concave piloted bit in your table-mounted router. (We used Jesada's Queen Anne Bit, no. 610-500; see our Buying Guide.) Raise the bit to its full ¾" cutter lengths and rout the inside bottom edge of each rocker. See the Rocker Routing Bottom Edges detail *below*.

Lower the bit so only ½" of the cutter is above the table, and rout the outside bottom edges.

8 Chuck a 1/16" round-over piloted bit in your router and rout along the top inside and outside edges of the rockers. Stop just short of running the pilot over the drilled holes. Hand-sand the edges in these areas to conform with the 1/16" round-overs. Dry-fit the rockers to the legs. (We used a wood rasp to modify the lower tenons for an easier fit. We rasped the outside face of the rear tenons and the inside face of the front tenons.) Disassemble the chair parts.

Using white woodworker's glue, glue and clamp the ⅛" pieces to the form and let the glue-up sit overnight.

Okay, let's form a fancy seat back

1 From two lengths of 6/4 stock, resaw seven pieces to 3/16×4¼×23". Now, plane the pieces to ⅛" thick.

2 Cut three 2×4s to 22" and glue them together face to face. Apply the seat back form pattern to the lamination's 3½" face and bandsaw the form to shape. Sand to the cutline.

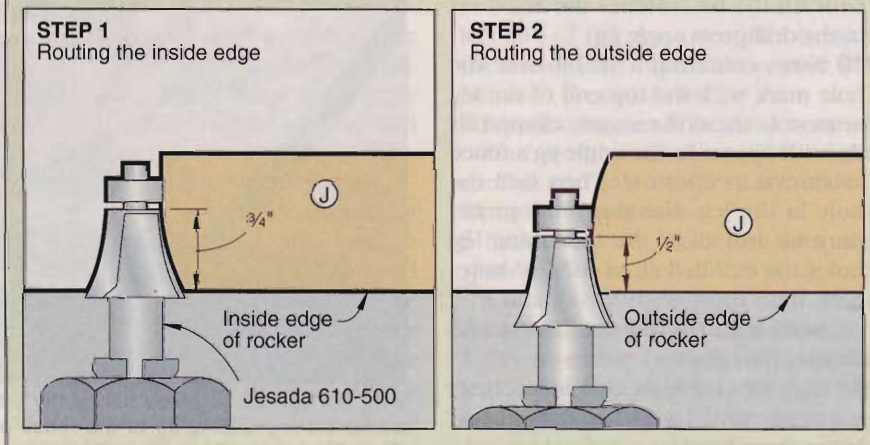
3 Place waxed paper over the contact surface of the form. Now, apply white woodworker's glue to the mating surfaces of the ⅛" pieces, and bend and clamp the pieces to the form as shown in *Photo I*. (We taped clamping blocks to the outside lamination with double-faced tape to protect the wood. We used white glue for the longer open time.) Let the lamination cure overnight.

4 Scrape or sand off excess glue on the lamination; then joint one edge. Now, with one edge true, adjust your tablesaw and rip the lamination to final width. Keep the portion in contact with the blade's cutting edge on the table as you saw through this curved seat back blank.

5 Adhere the patterns to the bottom edge and front face of the lamination, aligning the centerlines.

6 Chuck a ½" bit in your drill press. Place the angle jig on your drill-press table, hinge to the right, and remove the inside triangular side. Now, referring to the angles on the Seat Back Bottom View pattern, adjust the angle jig, clamping a block of wood under the open side of the jig to maintain

ROUTING ROCKER BOTTOM EDGES



the angle. Align the gauge with the hole centerlines and drill press column, as shown in *Photo J*. Drill the holes for the rear back spindles (H) and splats (I). (Note that we stabilized the seat back blank on edge with a pair of clamped wood blocks.)

7 Bandsaw the seat back to shape, cutting just outside the line, then sanding to the line.

Add curved armrests for maximum comfort

1 Plane, rip, and crosscut two pieces of stock to 1×4×14¾" for armrests (L).

2 Adhere the left and right armrest patterns to the stock. (Note that these patterns apply to the bottom surfaces of the armrest blanks.)

3 Return to a ¾" bit, and place the angle jig on your drill press with the hinged end to the front. Adjust it to 80°. Follow the orientation on the patterns, and align the hole centerline of one armrest with the column using the gauge. Drill the hole and repeat the process for the other armrest.

4 Bandsaw and sand the armrests to shape. Label one armrest "left" and one "right."

5 Chuck a ½" round-over bit in your table-mounted router, and round over the top edges of each armrest.

6 Using an ocscillating spindle sander or drum sander, sand one end of each arm to fit the rear back spindles (H), where indicated on the pattern. Note that these recesses are angled to fit the tapered spindles.

Now for the best part—assembling the rocker

1 Remove all patterns and labels and finish-sand the chair parts. (We used a foam block and 180-grit sandpaper.)

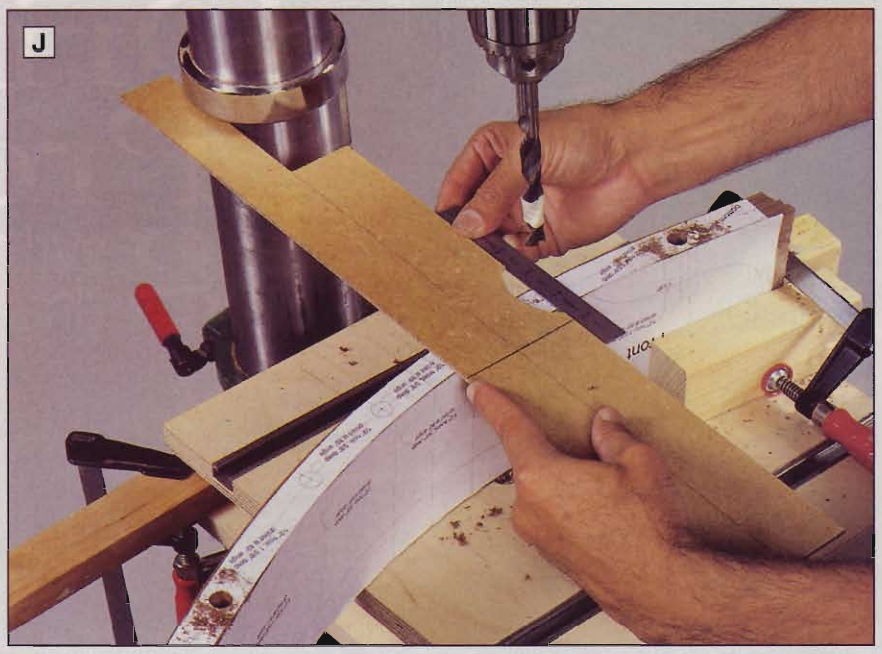
2 Starting with the seat, dry-fit the chair parts. (We relied on a mallet to lightly tap parts together.)

3 With white woodworker's glue, assemble the rockers and legs to the seat. Let the assembly dry overnight. With the exception of the armrest supports (G), glue in remaining spindles, along with the seat back.

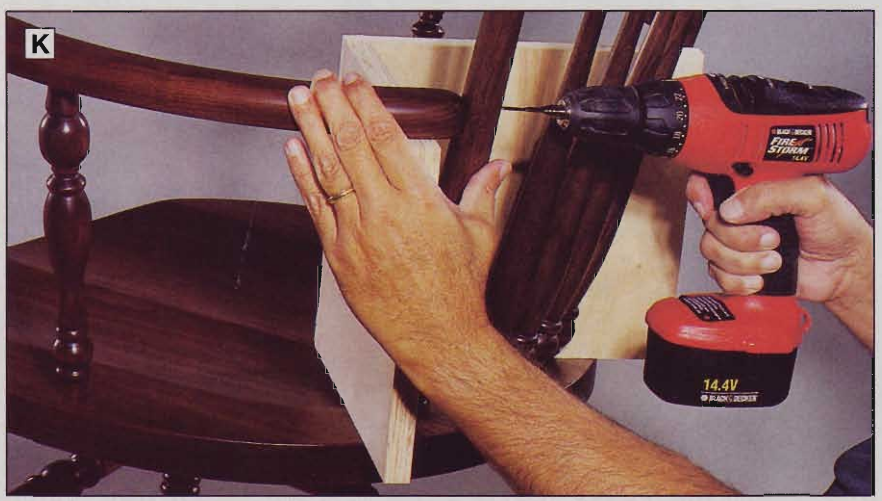
4 Next, dry-fit the armrest supports (G) and the armrests (L) together and to the seat. Measure down from the bottom of the armrest to the seat at the support location. Make a simple right-angle spacer block to this length. (We screwed two pieces of ¾" scrap plywood together.)

Now, rest the notched end of one armrest on the spacer and against the back spindle (H). Holding the armrest firmly in place, determine the screw hole location on the spindle's back surface. Mark it with an awl. Using a portable drill, bore the hole, as shown in *Photo K*. (We used a no.10 countersink/counterbore bit for this.) Repeat for the other armrest. Test-drive the screws; then dissasemble and glue and screw these parts to the rocking chair. Plug the holes.

5 Finish the chair. (We went with three coats of natural oil finish, letting each coat dry completely and sanding with steel wool between coats. Finally, we rubbed out the finish with three coats of paste wax, applying it with cheese cloth and buffing it with clean cotton rags.)



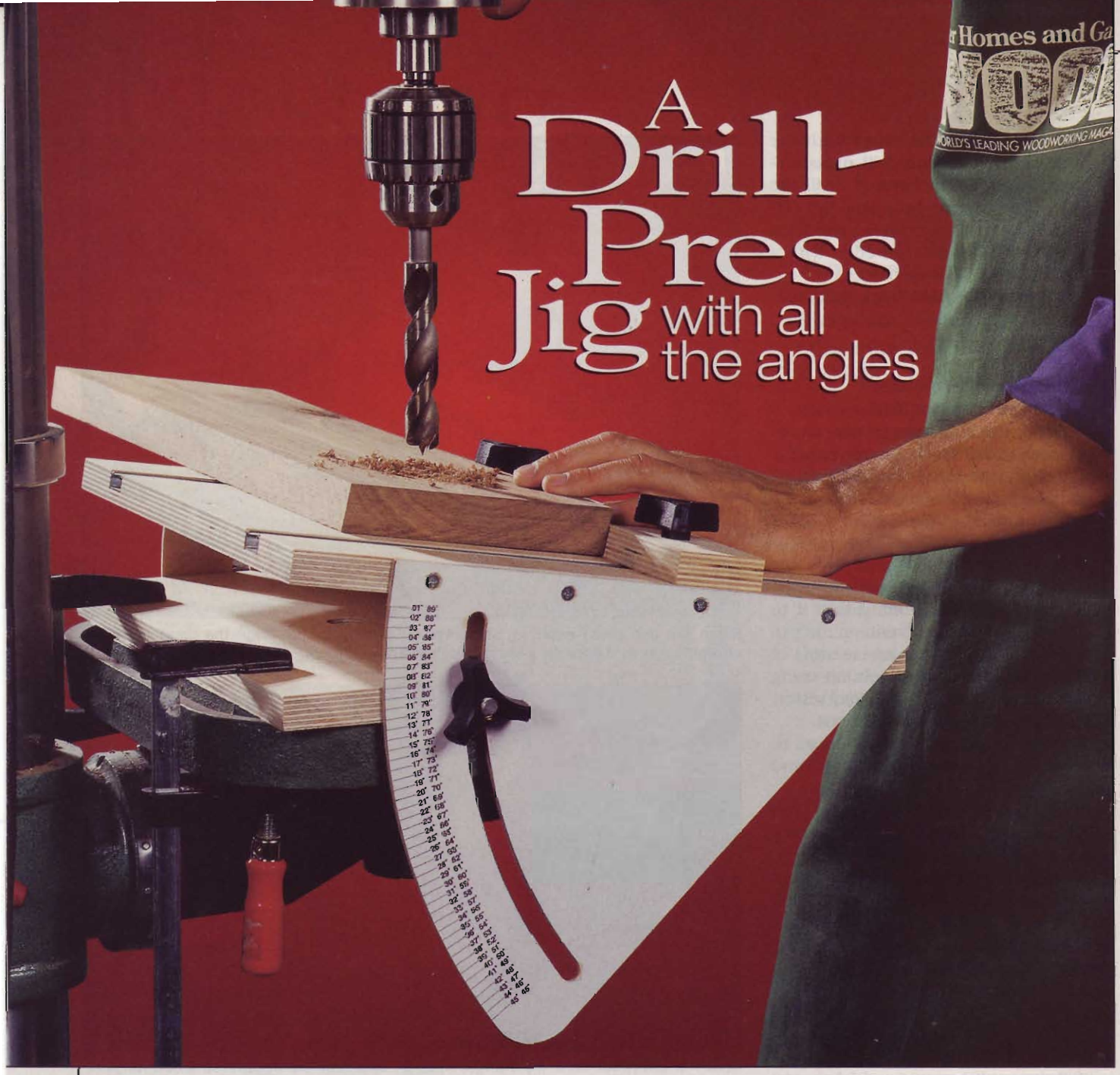
Place the drill press angle jig sideways on the drill press, align the gauge using a straightedge, and bore the hole to depth in the seat back.



Rest the armrests on a right-angle spacer, and drill the countersink/counterbore holes with a portable drill.

Written by Jim Harrold
Photographs: Hetherington Photography
Illustrations: Kim Downing; Lorna Johnson

A Drill-Press Jig with all the angles



Even if you're fortunate enough to have an accurate drill press with a tilting table, the one-way (side-to-side) tilt action might not accommodate all the angles or workpieces you deal with. Worse still, the fixed tables on some older drill presses give you precision for 90° angles and that's it.

This adjustable angle-drilling jig gives your drill press a lot more versatility. It helps you position and drill workpieces consistently—the essential job of any drill press—and even can tackle such difficult tasks as the compound angles required for our rocking chair project on *page 53*.

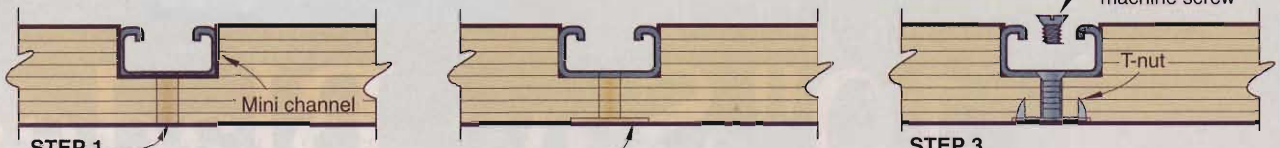
Two Baltic birch panels—one base and one platform—make up most of the jig. The base clamps or bolts to the drill press table, and the platform pivots to angles between 0° and 45°.

You'll find the angle scale in the *WOOD PATTERNS*® insert. Simply cut it out and use spray adhesive to glue it to a piece of ⅛" plywood or hardboard. Set another ⅛" panel (for the righthand angle support) underneath the first and cut them out together, oriented back to back. Drill starter holes at the ends of the curved slot, then cut the center portion out with a scrollsaw or jigsaw.

Mounting the table correctly requires the use of a simple indexing template, shown at a reduced scale in the *WOOD PATTERNS*® insert. Cut a notch at one corner (equal to half the column diameter) so you can line up the template edge with the centerline on the jig. For more details on how to set up and use the jig, see *page 54*.

Written by Bill LaHay
Photograph: Hetherington Photography
Illustrations: Roxanne LeMoine; Lorna Johnson

HERE'S HOW TO INSTALL THE MINI CHANNEL



STEP 1
Drill an 11/64" hole through the channel and plywood, centered on the channel.

STEP 2
Bore a 5/8" hole 1/32" deep, centered over the 11/64" hole.

STEP 3
Insert the T-nut and countersink for a #6 flathead machine screw. (Note that the T-nut gets chamfered as well.)

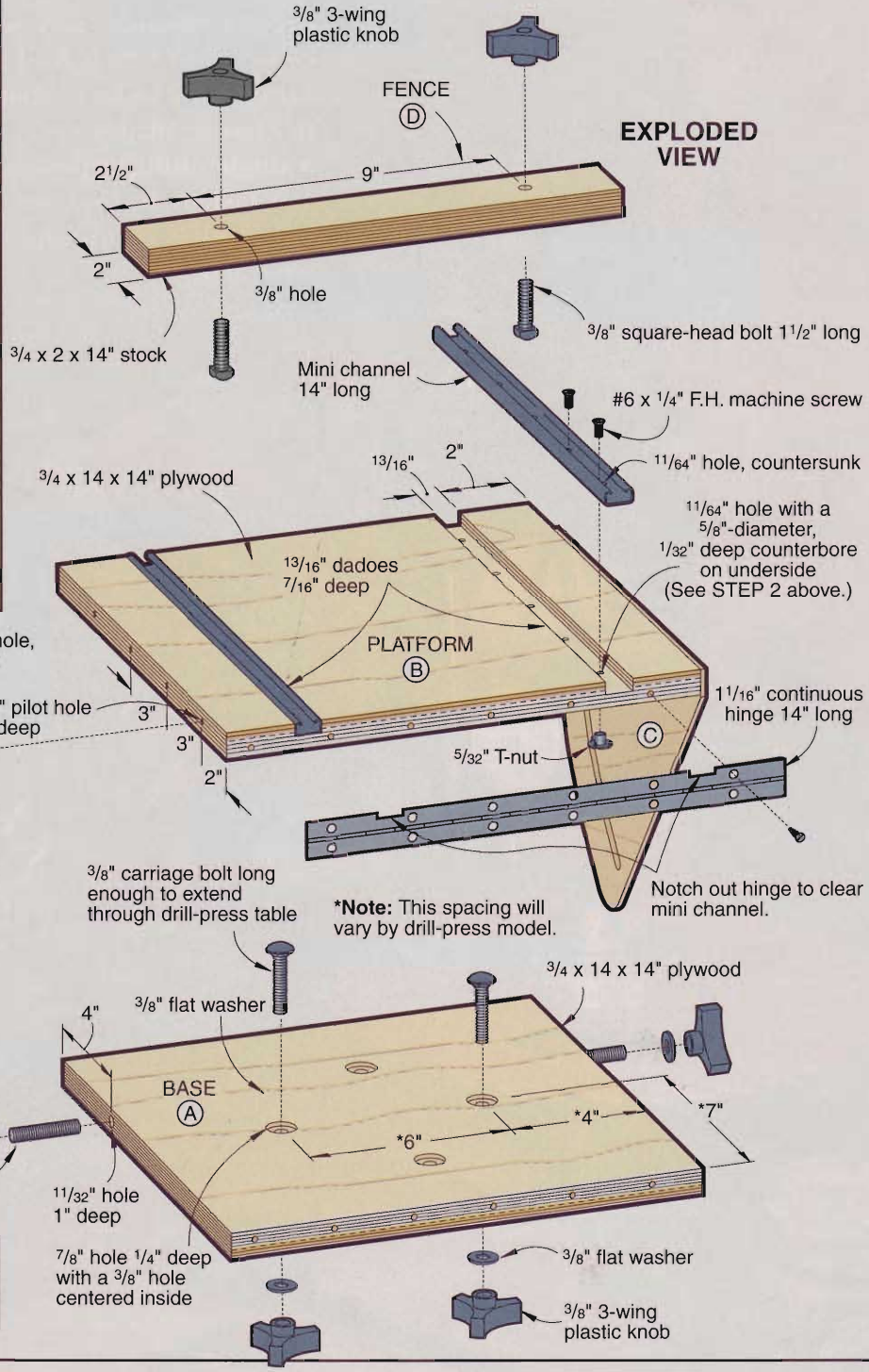
Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A base	3/4"	14"	14"	BP	1
B platform	3/4"	14"	14"	BP	1
C angle supports	1/8"	9 3/4"	11 7/8"	HB	2
D fence	3/4"	2"	14"	BP	1

Materials Key: BP–Baltic birch plywood, HB–hardboard.

Supplies: 3/8x3/16" mini channel (2 pcs. @14" long), #6–32 T-nuts and mating #6–32x1/4" flathead machine screws (10 ea.), 3/8x1 1/2" square-head bolts (2), 3/8x3" carriage bolts (2), 3/8" 3-wing plastic knobs (6), 3/8" flat washers (8), 3/8x2" threaded rod (2), #8x1" flathead wood screws (8), 1 1/16x14" continuous hinge with mounting screws.

Buying Guide
Hardware kit. Includes all hardware described above, $24.95 ppd. Ask for kit #DP-AJ.
Lumber kit. Includes Baltic birch plywood and 1/8" hardboard, $12.95 ppd. Kit #LP-1.
Contact Schlabaugh and Sons Woodworking, 720 14th Street, Kalona, IA 52247, 800/346-9663.

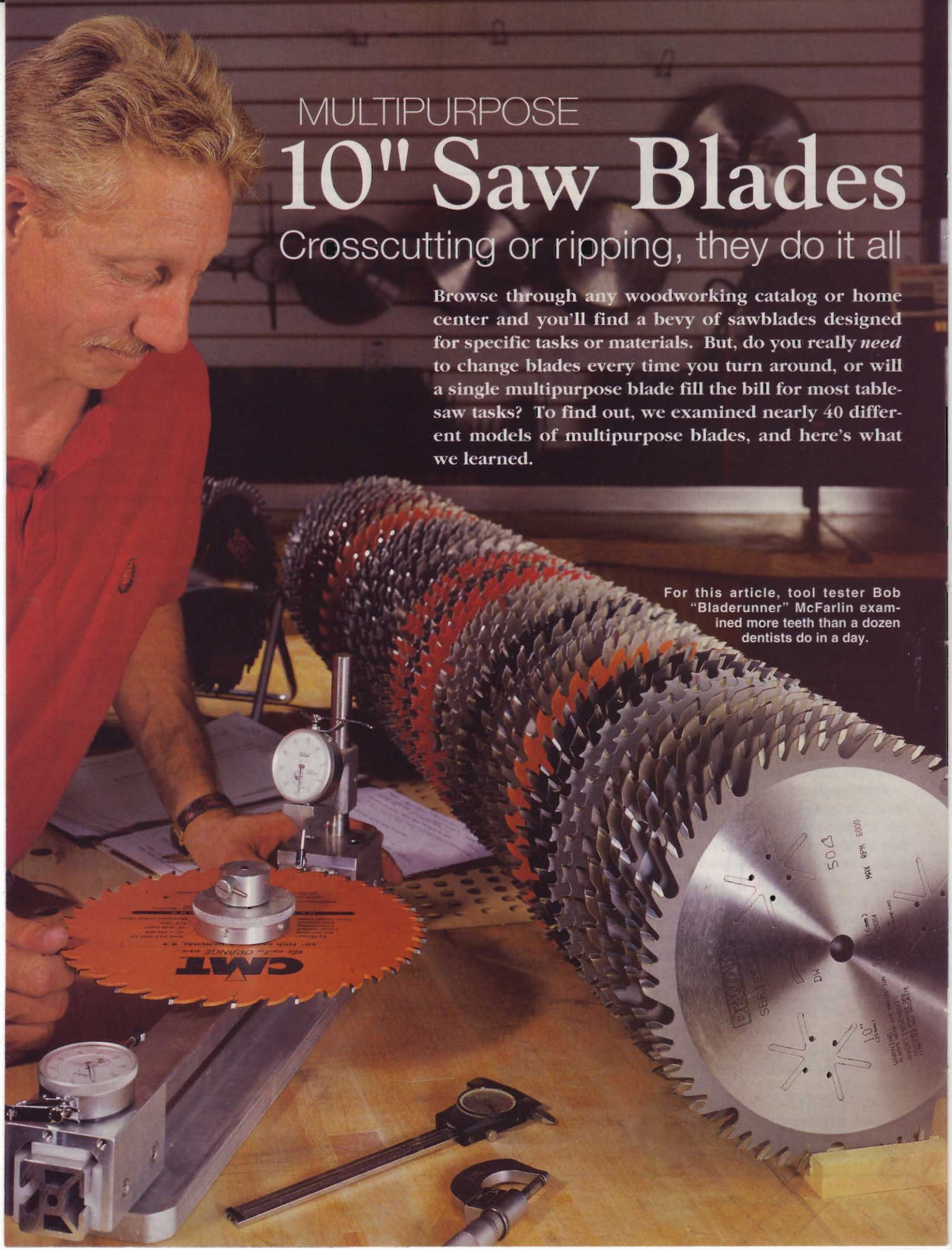


SEE THE *WOOD PATTERNS*® INSERT FOR FULL-SIZE PATTERN

MULTIPURPOSE 10" Saw Blades

Crosscutting or ripping, they do it all

Browse through any woodworking catalog or home center and you'll find a bevy of sawblades designed for specific tasks or materials. But, do you really *need* to change blades every time you turn around, or will a single multipurpose blade fill the bill for most tablesaw tasks? To find out, we examined nearly 40 different models of multipurpose blades, and here's what we learned.



For this article, tool tester Bob "Bladerunner" McFarlin examined more teeth than a dozen dentists do in a day.

Fast Facts

- For critically acclaimed cutting, start with a well-tuned saw. Even the best blade will perform poorly in a badly maintained tool.
- In our test, blades with only alternating top bevel (ATB) teeth outperformed those with a combination of ATB and raker teeth.
- Thin-kerf blades put less strain on tablesaw motors, especially lower-powered saws. But some full-kerf blades are thin enough to cut almost as efficiently as a thin-kerf.

To evaluate how easily each blade cut, we used a Comatic power feeder (Sunhill Machinery, 800/929-4321) to rip thick pine boards at a constant rate, and measured the saw strain with a multimeter.

We started by taking the blades for a test spin

For our test, we acquired two samples of each model (74 blades in all). To objectively measure the blades before putting wood to them, *WOOD*® magazine tool tester Bob McFarlin constructed the precision testing stand shown in the photo at *left*. The hub of the rig is ground to exactly ⅝" diameter to test each blade's arbor hole for fit, and a dial-indicator gauge adorns each end of the stand.

The vertical gauge Bob is using in the photo measures the blade's plate and teeth for runout (any deviation from perfectly flat). Runout greater than .005" can increase the amount of chipping and tearout, and wastes wood by widening the kerf. We measured for runout on the plate just below the gullet and on the sides of each tooth.

The horizontal dial indicator measured the height of each tooth in relation to the center of the blade. If all teeth are equidistant from center, or *concentric*, each one works equally hard when cutting stock. If not, the higher teeth have to remove the stock left by the lower teeth, prematurely dulling the blade and leading to chipping and tearout.

While examining each of the 3,278 teeth under 30X magnification, we noted any rounded points or chipped carbide. The ratings for this test are shown in the Quality of Factory Grind column in the chart at the *end of the article*.

After a thorough tune-up of our tablesaw, it was time for some real-world testing. We ripped and crosscut ¾" oak, 1½" pine, ¾" oak-veneer plywood, and ¾" melamine-coated particleboard with each model of blade. After every cut, we looked for and noted any evidence of chipping, tearout, and scratching along the fresh-cut edges.

Finally, to objectively compare ease of feed, which indicates how much strain the blade places on the saw's motor, we used a power feeder (shown *above*) to rip 1½"-thick pine boards. An inline digital multimeter recorded the change in current draw. We also measured each blade's noise level during this test.

General purpose vs. combination: What's in a name?

Take a gander at a dedicated ripping blade and you'll find about 20 flat-ground teeth around its perimeter. On the other hand, a blade engineered purely for cross-cutting sports 60-80 teeth with bevels angled in alternating directions—a pattern called *alternate top bevel* (ATB).

Blade makers have long sold blades that incorporate elements of both styles as *combination* blades. Such blades group four ATB teeth, preceded by one slightly lower, flat-ground tooth, called a *raker*. (See *foreground* blade in photo at *right*.) You'll usually find 10 sets of teeth in this pattern for a total of 50 teeth—which, not coincidentally, is halfway between a ripping blade's 20 and a crosscut blade's 80.

Deep gullets, each followed by a raker tooth and four ATB teeth, distinguish a combination blade (foreground) from a general purpose blade (background), with its evenly spaced ATB teeth and consistently deep gullets.

But in recent years, the *general-purpose* blade has gained popularity. These blades do away with raker teeth and distribute the remaining 40 ATB teeth evenly around the blade, as shown on the *background* blade. Only a few such blades were on the market ten years ago; these days, virtually every major manufacturer sells a general-purpose blade. And with good reason: The smoothest-sawing blades in our test were 40-tooth ATBs.

Continued

10" Saw Blades

Blade anatomy: Understanding the tooth and consequences

To get a fix on why some blades cut cleaner than others, you need to understand how tooth shape and plate characteristics affect blade performance. Use the Blade Geometry drawing *below* as a reference while you read.

Hook angle. If you draw a line from the center of the blade to the tip of a tooth, the angle formed between that line and the tooth face is called the *hook angle*. This measurement impacts the angle at which the tooth penetrates the wood. We found the cleanest cuts resulted when the tooth entered the stock at a 45° angle.

By raising or lowering the blade in the saw, any of the models in our test can achieve that angle. But we found that an 18-20° hook provides that optimum entry angle with the blade at the safest cutting height—with the gullet about ⅛" above the stock. As you can see in the drawing *below right*, you'd have to put the gullets of a 10°-hook blade 1¼" above the workpiece (which we don't recommend) to get the same entry angle.

Bevel angle. Blade makers grind the top of each carbide tooth to a specific angle, called the *bevel angle*. Except for the Craftsman Professional C300 model, which we'll discuss in a moment, all of the blades in our test have bevel angles ranging from 0° (raker tooth) to 25°. Raker teeth make rip cuts more efficiently because each tooth tends to pre-split the wood along the grain like a splitting wedge in a log. However, this same action splinters the wood in cross-grain cuts.

A beveled tooth behaves more like a chisel. Its sharp point scores the material before the beveled edge shears through the wood fibers. (Craftsman's unique Razortooth design, in the photo *above*, features hollow-faced teeth, where the tooth face is concave. This leaves each tooth with two scoring edges, so the blade acts almost like an 80-tooth blade crosscutting, but struggles in rip cuts.)

Craftsman's "Razortooth" (on the Professional C300 blade) sports a curved face so each tooth does twice the work of one ATB tooth.

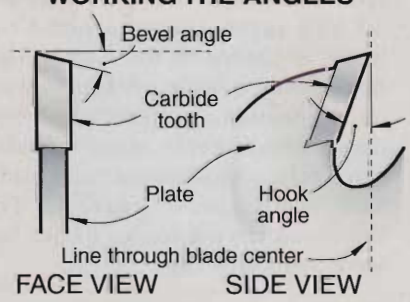
Generally speaking, the steeper the bevel angle, the cleaner the crosscut. But there is a trade-off: Like a chisel, the finer cutting edge of a steeply ground tooth dulls quickly and gets damaged more easily than a shallower-beveled tooth.

Plate. All of those sharp teeth are useless as cutting tools until they are brazed to the blade's body, or *plate*, which is either laser-cut or stamped from a sheet of steel. All other things being equal, we prefer a laser-cut plate because it can be cut from harder steel, making for a more stable saw blade.

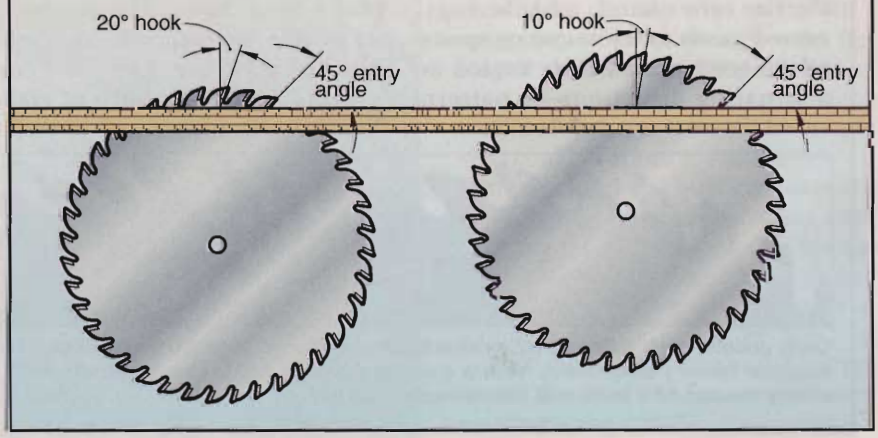
Plate thickness also contributes to blade stability, with thicker plates holding their rigidity better under stress than thin plates. However, thin blades have other advantages. See our comparison of thin- and full-kerf blades on the *next page*.

Some blade makers, such as CMT, Freud, and Oldham, apply a non-stick coating, such as Teflon, to the plate. This can reduce burning by blades with very little side clearance (the difference in thickness between the side of the tooth and the plate). Although coated blades also resist rust, for this style of blade we found no difference in cutting performance.

BLADE GEOMETRY: WORKING THE ANGLES



HOW BLADE HEIGHT AFFECTS CUTTING PERFORMANCE



Here's the skinny on thin-kerf blades

If the centerpiece of your shop is a contractor-style tablesaw with a 1½-hp.-or-less motor, it makes good sense to use a thin-kerf blade for most shop chores. Because a thin kerf blade removes less stock with each cut, it requires less power to operate and saves more of your expensive stock from winding up in the dust collector.

In fact, in our ease-of-feed test, we power-fed boards into each blade on two different saws—a 220-volt, 3-hp. cabinet saw, and a 110-volt, 1½-hp. contractor's saw. On the less-powerful saw, only thin-kerf blades—those with a .111" or less kerf—could handle our stiff 38-feet-per-minute (fpm) test. Full-kerf blades stalled the small saw at that rate, but did better when we slowed the feed rate to 15 fpm.

Because the thin plates are less rigid than their full-kerf counterparts, they're more prone to deflection by knots or tight grain in the workpiece. That's why we recommend installing a blade stabilizer (also called a stiffener or dampener) to stiffen a thin plate. These devices also can improve the performance of full-kerf blades.

Remember, though, stabilizers essentially thicken the plate at the center, so if they're larger than 3½", they also reduce the blade's cutting capacity. (A 6" stabilizer lowers the capacity to about 1½".)

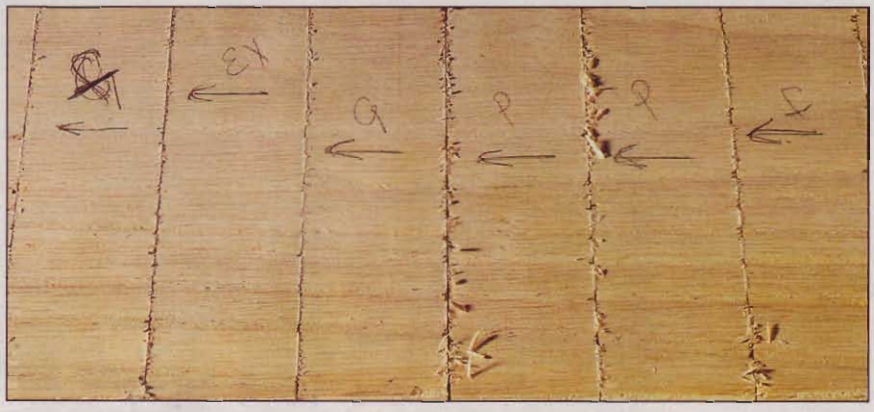
A few more performance issues to sink your teeth into

Quality of the cut edge. If you demand a scratch-free edge from your tablesaw blade, you certainly can get it from some of the blades in our test, such as the CMT General, Forrest Woodworker II, Freud F410, Jesada CGP-2000, Ridge Carbide, and Tenryu. And of these, only the Forrest blades actually burnished the cut edges.

But the same narrow side-clearances that burnish also can burn your workpiece. So if you choose one of the blades rated excellent in this category on the chart, you'll need to keep your stock moving through the blade and periodically remove pitch buildup from behind the teeth. On the other hand, blades rated as good in this category require a little light hand-sanding to remove the tooth scratches, but aren't as likely to smoke your stock.

You'll get more sharpenings out of the background blade because the teeth have more carbide to grind.

Quality of factory grind. Getting the tooth angles right isn't all a manufacturer needs to do to turn out a well-performing blade. A carelessly sharpened blade can exhibit rounded tips or a jagged cutting edge, and either characteristic lowers the quality of the cut. Bear in mind, however, that a skilled sharpener usually can resharpen even a badly dinged edge to peak performance.



This photo shows the gamut of bottom-side tearout and chipping we found in our test. The material shown is ¾" oak-veneer plywood.

While we're on the subject of sharpening, if you're the kind of woodworker who has your blades sharpened frequently, consider buying a blade with a thicker carbide tooth, as shown *above*. You'll get more sharpenings out of your blade.

Noise level. The National Institute for Occupational Safety and Health (NIOSH) says that hearing damage can occur when you're exposed to a noise level of 85 decibels (dB) for 8 hours at a time. They also say that every 3dB increase cuts your safe exposure time in half. Although few of us spend a full workday around a running tablesaw, by that standard, the quietest-cutting blade in our test

Continued

10"Saw Blades

CUTTING CLASS: 37 10" MULTIPURPOSE SAWBLADES

BRAND	MODEL	TEETH: NUMBER	GRIND PATTERN (1)	BEVEL ANGLE (DEGREES) (2)	HOOK ANGLE (DEGREES)	KERF WIDTH (INCHES)	PLATE: THICKNESS (INCHES)	LASER-CUT (L) OR STAMPED (S)	PERFORMANCE RATINGS (3): RUNOUT (4)	CONCENTRICITY	QUALITY OF FACTORY GRIND	SMOOTHNESS OF EDGE (5)	CROSSCUT TEAROUT (6): OAK: TOP OF CUT	OAK: BOTTOM OF CUT	PINE: TOP OF CUT	PINE: BOTTOM OF CUT	PLY (7): TOP OF CUT	PLY (7): BOTTOM OF CUT	MCP (8): TOP OF CUT	MCP (8): BOTTOM OF CUT	EASE OF FEED (9)	NOISE LEVEL (10): NO LOAD	NOISE LEVEL (10): CUTTING	WARRANTY (11)
AMANA	610404	40	ATB/R	12	10	.130	.094	L	G	E	G	G	E	G	E	F	G	F	E	P	G	94	101	S
	610504	50	ATB/R	12	10	.132	.094	L	F	E	G	G	G	G	E	G	G	F	E	P	G	95	104	S
CMT	The General 213	40	ATB	20	18	.124	.100	L	G	G	G	E	E	E	E	G	E	F	E	F	G	93	100	Life
	The General 214 (thin-kerf)	40	ATB	20	18	.107	.081	L	G	G	G	E	E	E	E	G	E	G	E	F	E	95	99	Life
CRAFTSMAN	Silver Series	40	ATB	12	13	.116	.085	S	G	F	F	F	F	G	G	F	F	F	E	P	G	95	98	Life
	Professional C300 (26789)	40	H	*	15	.120	.087	L	E	G	G	G	E	E	E	E	G	F	G	G	P	96	100	Life
	Professional Woodworking C400 (26782)	50	ATB/R	15	10	.127	.087	L	G	F	G	G	G	G	E	G	G	F	E	F	E	96	99	Life
DELTA INDUSTRIAL	35-613	40	ATB	15	12	.123	.089	L	G	G	F	G	G	G	E	F	G	F	E	F	G	95	97	Life
	35-617	50	ATB/R	15	15	.124	.086	L	G	G	F	G	G	F	G	F	G	F	E	F	G	95	97	Life
DEWALT	DW7623 (60 series)	40	ATB	15	20	.119	.082	L	G	G	G	G	E	E	E	G	E	P	E	F	G	94	96	1 yr.
	DW7615 (60 series)	50	ATB/R	10	15	.121	.082	L	E	E	G	G	G	G	E	G	G	F	E	F	G	95	95	1 yr.
DML	Golden Eagle 74010	40	ATB	20	15	.128	.087	L	G	E	G	G	G	G	E	G	F	G	E	G	F	93	97	Life
	Golden Eagle 74020	50	ATB/R	20	15	.131	.085	L	G	F	G	G	G	G	E	G	G	F	E	F	G	95	97	Life
FORREST	Woodworker II	40	ATB	15	20	.125	.095	L	E	E	E	E	E	E	E	E	E	E	E	G	G	95	97	Life
	Woodworker II (thin-kerf)	40	ATB	15	20	.107	.077	L	E	E	E	E	E	E	E	E	E	E	E	G	E	95	97	Life
FREUD	F410	40	ATB	18	18	.126	.092	L	E	E	G	E	E	G	E	E	E	E	E	E	G	95	96	Life
	LU72M010	40	ATB	10	13	.123	.086	L	E	G	G	G	E	G	E	G	G	F	E	F	G	94	96	Life
	TK306/TKR306 (thin-kerf)	40	ATB	15	15	.094	.071	L	E	E	E	G	E	G	E	G	G	G	E	G	E	94	95	Life
	LU84M011	50	ATB/R	20	10	.118	.086	L	E	E	E	E	E	F	E	G	G	G	E	P	E	95	97	Life
	TK906/TKR906 (thin-kerf)	50	ATB/R	10	15	.092	.071	L	E	E	E	G	E	G	E	G	G	G	E	G	E	96	97	Life
IRWIN	Premium 56750	40	ATB	15	20	.115	.079	L	G	G	E	G	E	G	E	E	G	G	E	F	E	93	95	Life
JESADA	CGP-2000	44	ATB	20	18	.130	.099	L	G	G	G	E	E	E	E	E	E	E	E	E	G	94	98	Life
	Maxi-Combo	50	ATB/R	15	12	.126	.084	L	G	G	G	G	E	G	E	E	G	F	E	G	G	96	98	Life
	Maxi-Combo Light	50	ATB/R	15	12	.097	.065	L	F	G	G	G	E	G	E	G	G	F	E	F	E	95	98	Life
MAGNA	M87155	40	ATB	12	13	.107	.070	S	G	G	F	F	G	G	G	F	F	F	E	P	E	95	99	Life
MAKITA	792200-3	50	ATB	5	10	.109	.086	L	E	E	G	G	E	E	E	G	G	G	E	G	G	93	96	Life
OLDHAM/ US SAW	Woodworker's Choice C1040	40	ATB	15	12	.108	.074	L	G	G	F	F	E	F	E	F	G	P	E	P	G	95	98	Life
	Wizard Elite 100-7740T	40	ATB	15	12	.122	.095	L	F	G	F	F	E	F	E	F	G	P	E	P	F	94	96	Life
	Wizard Elite 100-7150T	50	ATB/R	15	12	.125	.088	L	F	E	G	G	E	G	G	G	G	G	E	F	E	96	98	Life
RIDGE CARBIDE	TS-2000	40	ATB	15	20	.126	.092	L	E	E	G	G	E	E	E	E	E	G	E	F	G	95	101	90 days
SYSTI-MATIC	10BB40	40	ATB	20	15	.130	.084	L	E	G	G	G	E	E	E	G	G	G	E	F	G	96	103	Life
	10BB50	50	ATB/R	20	15	.130	.083	L	G	G	G	G	E	G	E	G	G	F	E	P	G	95	104	Life
	10TF55	55	ATB/R	25	15	.110	.079	L	G	G	G	G	E	E	E	E	G	G	E	F	E	96	101	Life
TENRYU	Gold Medal	40	ATB	15	20	.111	.078	L	E	E	E	G	E	E	E	E	E	E	E	F	E	95	94	Life
	Rapid-Cut Planer Combo	50	ATB/R	15	15	.126	.087	L	E	E	E	G	E	E	E	E	E	G	E	G	G	97	95	Life

NOTES:

1. (ATB) Alternate-top bevel
   (ATB/R) Alternate top bevel & raker
   (H) Hollow-face
2. Bevel angles shown are for beveled teeth. Raker teeth have 0° bevels unless noted in comments.
   *No bevel due to hollow-face design.
3. E Excellent
   G Good
   F Fair
   P Poor
4. Measured 1/8" below gullet and on sides of teeth.
   E +/-.001-.002
   G +/-.003-.005
   F +/-.006-.008
5. E Teeth left no scratches.
   G Scratches required hand-sanding to remove.
   F Scratches required jointer or belt sander to remove.
6. All cuts made in 3/4" thick materials with gullets 1/8" above stock.
   E Fine chipping; edge suitable for edge joining or edge-banding.
   G Minor chipping; edge suitable for most applications.
   F Moderate chipping; requires sanding of edge or filler for some applications.
   P Severe chipping; requires filler.
7. Test results based on cuts made in high-quality oak-veneer plywood. Lesser-quality materials may increase chipping.
8. (MCP) Melamine-coated particleboard
9. Measured while ripping 1 1/2" pine at 15 feet-per-minute (fpm) on 1 1/2-hp. saw, and at 38 fpm on 3-hp. saw.
10. In decibels, measured at 24" from blade.
11. (Life) Warranted against factory defects for the life of the blade.
    (S) Warranted until first sharpening.
12. (G) Germany (J) Japan
    (IS) Israel (UK) United Kingdom
    (IT) Italy (US) United States
13. Prices current at time of article's production.
    (*) $95 for second blade when purchased with the first.

Freud F410

Freud TK306

Ridge Carbide TS-2000

CMT "The General" 214

Jesada CGP-2000

Tenryu Gold Medal

Forrest Woodworker II

	COUNTRY OF MANUFACTURE (12)	SELLING PRICE (13)	COMMENTS
	IS	$ 67	Generous carbide teeth for multiple sharpenings; thick plate for reduced deflection.
	IS	59	Generous carbide teeth for multiple sharpenings; thick plate for reduced deflection.
	IT	70	Leaves a very smooth ripped edge. Teflon-coated blade.
	IT	70	Thin-kerf version of the General 213. Easy feeding for low-powered saws.
	US	30	The least expensive blade in the test, but we'd spend just a little more for a Freud blade.
	US	47	Excellent results crosscutting solid materials, but ripping thick materials requires slow feed rate.
	US	63	Generous carbide teeth for multiple sharpenings. Widely available at retail outlets.
	G	59	Generous carbide teeth for multiple sharpenings. Price includes one free sharpening with shipping to Delta.
	G	59	Generous carbide teeth for multiple sharpenings. Price includes one free sharpening with shipping to Delta.
	UK	65	Well-constructed blade with thick carbide teeth. Widely available in retail outlets.
	UK	69	Well-constructed blade with thick carbide teeth. Widely available in retail outlets.
	US	65	Good results in solid materials; high-powered saw required for ripping.
	US	70	Medium-priced blade that delivers good results.
	US	107*	Outstanding sharpening and construction; left the smoothest cut edge in the test.
	US	107*	Thin-kerf version of Woodworker II. Easy feeding for low-powered saws.
	IT	57	Affordable blade with thick carbide teeth produce excellent results in most cuts.
	IT	46	Good-performing blade, but we'd spend $11 more for the F410 Quiet Blade.
	IT	34/39	Inexpensive thin-kerf blade gives good results. Easy feeding for low-powered saws. TKR is Teflon-coated version.
	IT	53	Leaves very smooth cut edges; excellent results for a 50-tooth blade.
	IT	38/44	Inexpensive thin-kerf blade gives above average results. Easy feeding for low-powered saws. TKR is Teflon-coated.
	J	70	Very easy feeding for low-powered saws.
	IT	70	Unusual 44-tooth pattern that gives excellent results in most cuts.
	IT	67	Raker teeth have 2° beveled edge to reduce tearout.
	IT	65	Thin-kerf version of Maxi-Combo. Among the easiest feeding for low-powered saws.
	US	42	Very easy feeding for low-powered saws.
	J	120	Pricey, but holds sharpness due to outstanding factory-grind and shallow hook and bevel angles.
	US	59	Thinner kerf than other "full-kerf" blades makes for easy feeding, even on low-powered saws.
	US	39	Thick carbide teeth and Teflon-coated plate. Price includes two free sharpenings.
	US	49	Easy-feeding full-kerf blade. Thick teeth and Teflon-coated plate. Price includes two sharpenings.
	US	99	Well-constructed blade with generous carbide teeth. One of the top performers in our test.
	US	50	Affordable blade gives excellent results in many cuts.
	US	50	Affordable blade gives good results in most cuts.
	US	75	Unusual 55-tooth pattern gives good results. Thin kerf for easy feeding on low-powered saws.
	J	95	A top performer offering a very smooth cut edge and glass-smooth feeding.
	J	50	The smoothest-cutting of all the ATB/R blades in our test.

For more information, contact:

Amana 800/445-0077 www.amanatool.com	**DeWalt** 800/433-9258 www.dewalt.com	**Jesada** 800/531-5559 www.jesada.com	**Oldham** 800/828-9010 www.oldham-usa.com
CMT 888/268-2487 www.cmtusa.com	**DML** 800/242-7003 www.primarktoolgroup.com	**Magna** 800/624-9044 www.vermontamerican.com	**Ridge Carbide** 800/443-0392 www.ridgecarbidetool.com
Craftsman 800/377-7414 www.sears.com/craftsman	**Forrest** 800/733-7111 www.stores.yahoo.com/forrestman	**Makita** 800/462-5482 www.makitatools.com	**Systi-Matic** 800/426-1035 www.systimatic.com
Delta 800/223-7278 www.deltawoodworking.com	**Freud** 800/472-7307 www.freudinc.com	**Marathon** 800/866-5740 www.americantool.com	**Tenryu** 800/951-7297 www.tenryu.com

For specifications on other types of tools, click on Tool Comparisons at http://www.woodmail.com.

(94dB from the Tenryu Gold Medal) can be used for an hour without hearing protection. By comparison, the loudest blades from Amana and Systi-Matic, at 104dB, shouldn't be endured for more than 7 minutes unprotected.

Alright guys, cut to the chase and pick a winner

When all is said and done, we're happy to say there really wasn't a bad blade in the bunch. But 40-tooth ATBs ruled the roost in this test. If you demand a scratch-free, burnished edge on your cuts, the Forrest Woodworker II will do the job—for a price. Ridge Carbide's TS-2000 comes close to that edge quality, but has more side clearance on the teeth and so is less likely to burn your material than the Forrest.

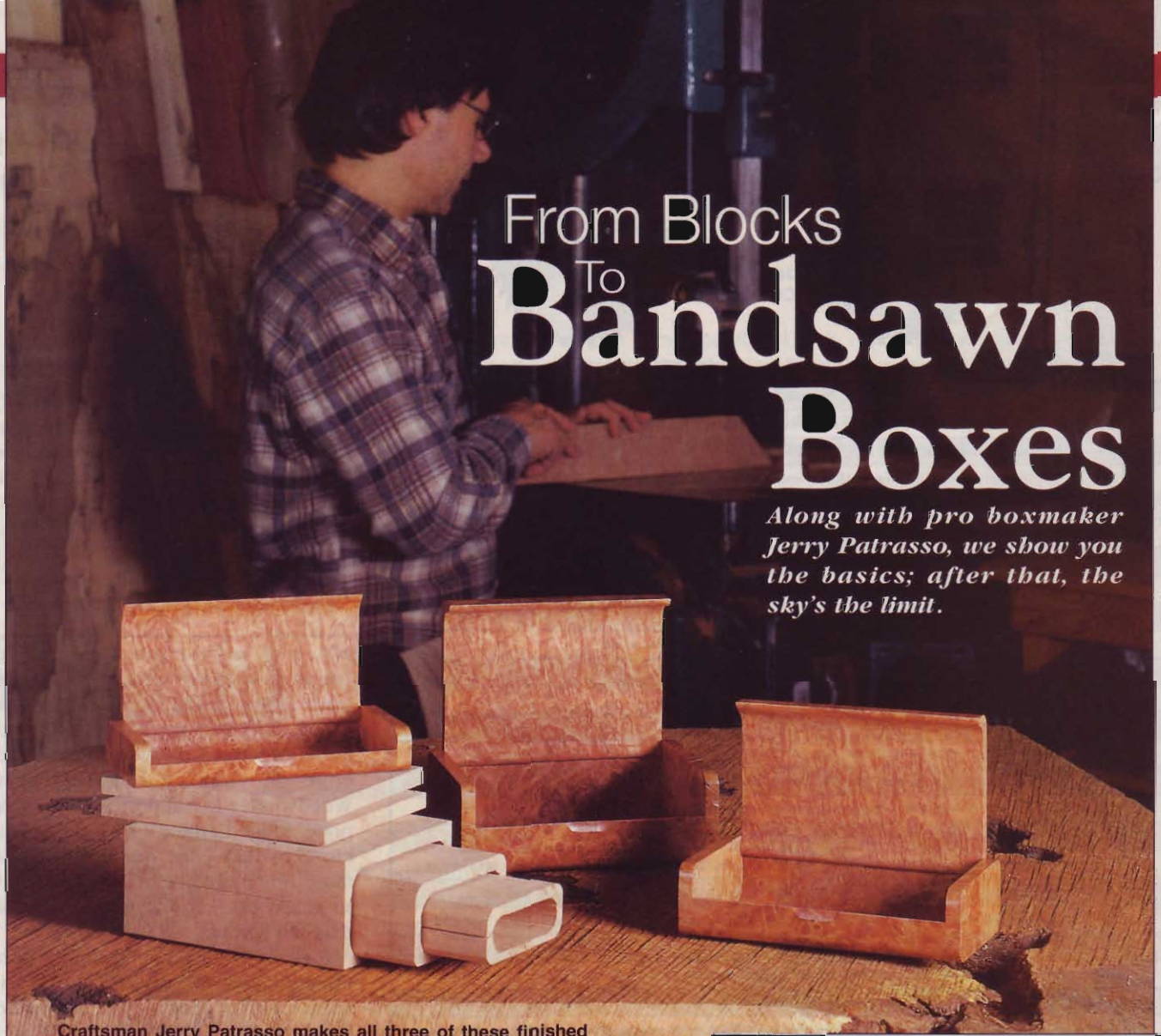
However, we were tickled pink with the cutting performance of three less-spendy blades: Jesada's CGP-2000 (the 44-tooth ATB), CMT's thin-kerf version of "The General", and Freud's new F410 blade. Each model performed about on-par with those more expensive blades, for $30–40 less.

For low-powered saws, you can't go wrong with the thin-kerf model of the Woodworker II, or either blade from Tenryu: the Gold Medal or the Rapid-Cut Planer (the best of the 50-tooth combination blades). All of these blades breezed through the ease-of-feed test on our contractor-style saw, and come from the factory with an outstanding tooth-grind. Here again, the price and performance of Freud's thin-kerf ATB, the TK306, also makes it an excellent choice in this category.

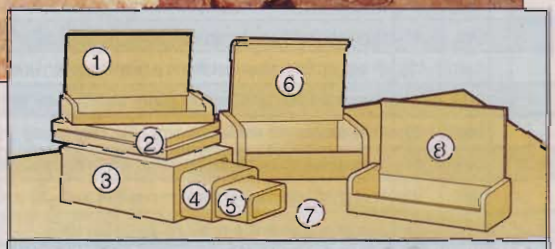
Written by Dave Campbell
Technical consultant: Bob McFarlin
Photographs: Baldwin Photography
Illustrations: Lorna Johnson

From Blocks To Bandsawn Boxes

Along with pro boxmaker Jerry Patrasso, we show you the basics; after that, the sky's the limit.



Craftsman Jerry Patrasso makes all three of these finished bandsawn boxes from a single block of redwood burl. You can, too, with the tips Jerry shares here.



1. Small box
2. Side stock
3. Large blank
4. Medium blank
5. Small blank
6. Large box
7. Raw material (redwood burl)
8. Medium box

First, a few box-making essentials

Although bandsawn boxes may appear complex, they're incredibly simple to make. All you need is a sturdy bandsaw and a few ideas to get you started. With that in mind, in the first part of this article we'll present the steps for making four simple bandsawn boxes. Each succeeding one increases slightly in complexity and teaches a different aspect of this craft. If you're new to bandsawn boxes, you may want to make all four from scraps of glued-up 2×4s. Once you feel comfortable, move on to fancier woods.

Your practice cuts also will tell you if your bandsaw is up to the task of cutting thick wood. First, equip the saw with a sharp, ¼"-wide, 6 teeth-per-inch, hook-tooth blade, and adjust the saw for a cut that's exactly 90° to the table. (You'll also need a similar ⅛" blade for some tight cuts.)

Get a feel for the cutting power of your saw by testing it in soft and hard woods up to 5" thick. Most benchtop bandsaws, and some stationary models, can't muster the power to cut hard *or* thick woods. You may find that you'll need to invest in a saw with at least a ¾-horsepower motor to cut stock more than a couple of inches thick. A quality set of blade guides will keep the blade from bowing sideways.

In the second part of this article, we will take you into the shop of box maker extraordinaire Jerry Patrasso. He'll show you how to craft the set of three boxes shown *above*.

Like Jerry, we prefer to cut bandsawn boxes from fanciful burls or spalted woods. Blocks of these materials can be expensive, but as you'll see, little stock goes to waste when you make a bandsawn box. If you favor a contemporary look, try laminating a block made of several species. You could, for example, laminate a walnut stripe within a maple block.

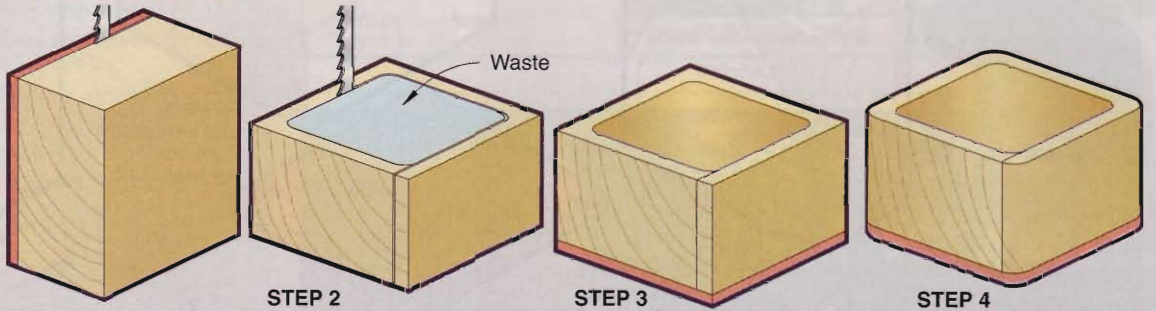
Continued

LET'S GET THINGS ROLLING WITH FOUR BASIC BANDSAWN BOXES

You can make any of these boxes by simply following the step-by-step illustrations. We did not include any dimensions because you can make them big or small depending on your needs and available stock. We do provide a full-size pattern of the heart-shaped box (#4) in the *WOOD PATTERNS®* insert. Make your entry cuts with the grain of the project pieces so they conceal better when you glue and clamp them to close up the blade kerfs. We think you'll have a lot of fun with these—we did!

Note: *Use sharp blades, and round their backs by touching a file or stone against the back corners as the saw runs. This will help the blade negotiate tight turns. Be sure to hold the file or stone firmly on the table, and go lightly when touching it to the blade. And always clean the bandsaw of dust to prevent any sparks from igniting a fire. Even after rounding a ¼" blade, you may find that to negotiate some especially tight turns you will need to use a ⅛"-wide blade (round it, too).*

1 Basic Open Box



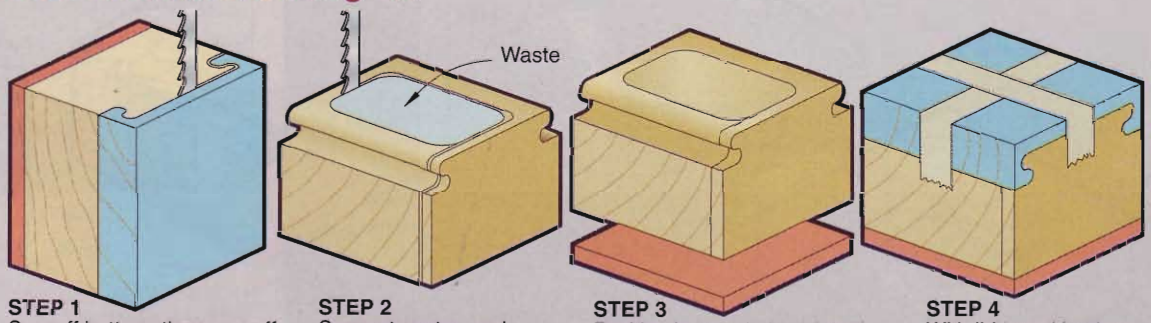
STEP 1
Saw off bottom.

STEP 2
Saw out center, and glue entry cut closed.

STEP 3
Position bottom in its original orientation, and glue it back on.

STEP 4
Shape and sand smooth the outside of box.

2 Basic Box With Sliding Lid



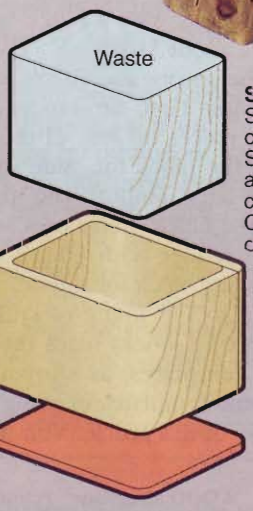
STEP 1
Saw off bottom, then saw off lid with interlocking cuts.

STEP 2
Saw out center, and glue entry cut closed.

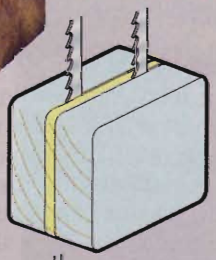
STEP 3
Position bottom in its original orientation, and glue it back on.

STEP 4
With lid taped in place, smooth outside of box.

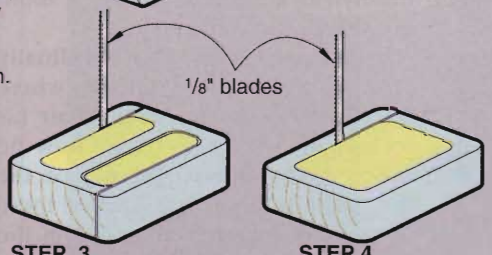
3 Basic Box With Lift-Out Tray



STEP 1
Saw off bottom of box.
Saw out center, and glue entry cut closed.
Glue bottom of box back on.

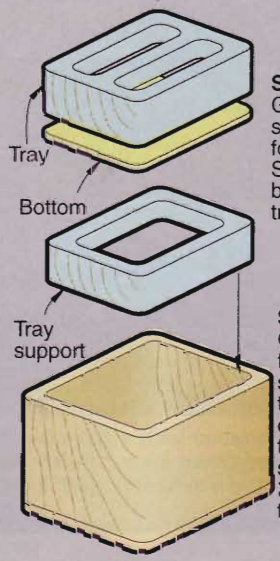


STEP 2
Saw out center of "waste" to be used as tray bottom.



STEP 3
Saw out two sections to create tray.
Glue entry cuts closed.

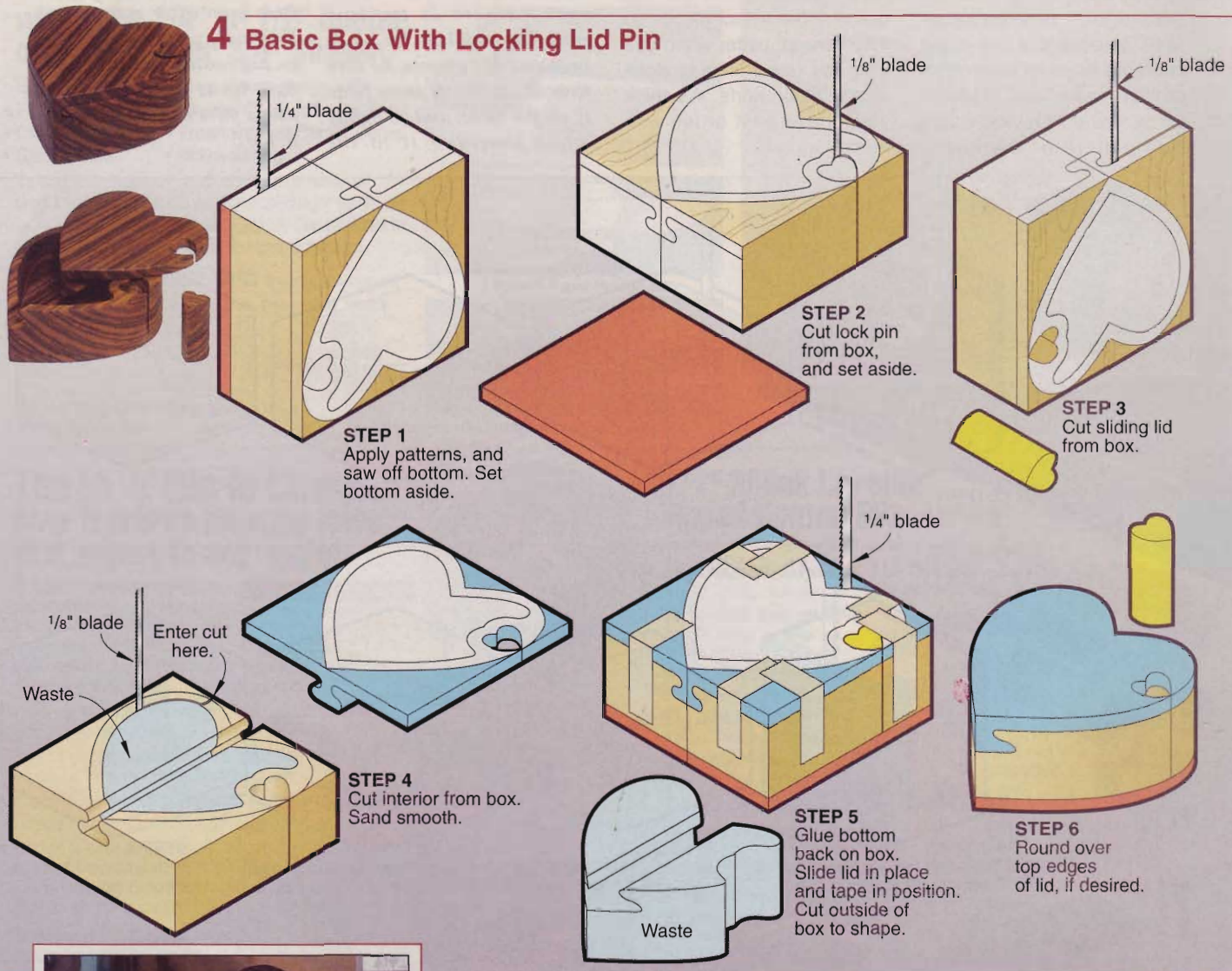
STEP 4
Saw out center section to create tray support.
Glue entry cut closed.

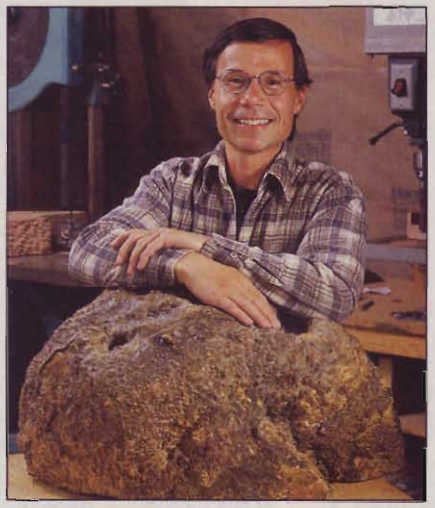


STEP 5
Glue center section formed in Step 2 to bottom of tray.

STEP 6
Glue section formed in step 4 to bottom of box to form a support for the tray to sit on.

Bandsawn Boxes


4 Basic Box With Locking Lid Pin
1/4" blade
STEP 1
Apply patterns, and saw off bottom. Set bottom aside.
1/8" blade
STEP 2
Cut lock pin from box, and set aside.
1/8" blade
STEP 3
Cut sliding lid from box.
1/8" blade
Enter cut here.
Waste
STEP 4
Cut interior from box. Sand smooth.
1/4" blade
STEP 5
Glue bottom back on box. Slide lid in place and tape in position. Cut outside of box to shape.
Waste
STEP 6
Round over top edges of lid, if desired.



Jerry Patrasso with a boxelder burl that he discovered in a public park and saved from a certain fate as firewood.

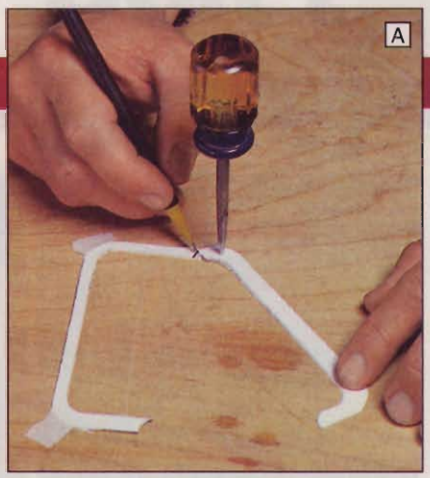
How to squeeze three bandsawn boxes with hinged lids from a single block of wood

After profiling Jerry Patrasso in the December 1993 issue of *WOOD*® magazine, we knew he had the art of bandsawing great-looking boxes down to a fine science. After all, by his own estimation he has made about 10,000 bandsawn boxes.

It took us a while, but we finally returned to Boulder, Colorado, where Jerry lives, so that we could share his techniques with you. Here's how he makes the set of boxes shown on the *first page* of this article. Each of these boxes goes together as shown in the Exploded View drawing at *right*.

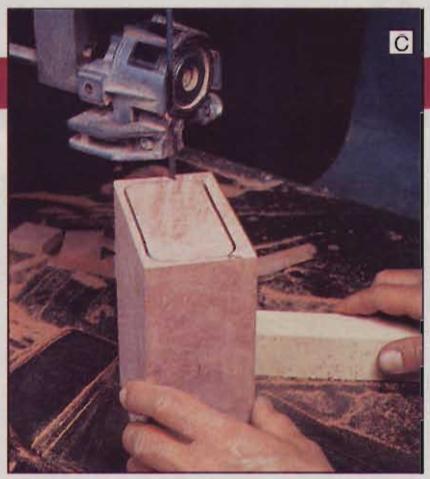
1 Jerry starts with a block of wood that's about 3¾×5¼×6". The block should be square and flat in all three dimensions. First, he bandsaws two ¼"-thick pieces off one of the 5¼×6" sides of the block for "side stock" to be used later. Smooth the just-sawn face of the block. (Jerry uses a stationary disc sander with 80-grit paper.) Recheck the block for square.

2 On a 3×5¼" piece of stiff paper (like card stock) mark three concentric templates, as shown in the Box Blank Templates drawing on the *last page* of this article. You will later

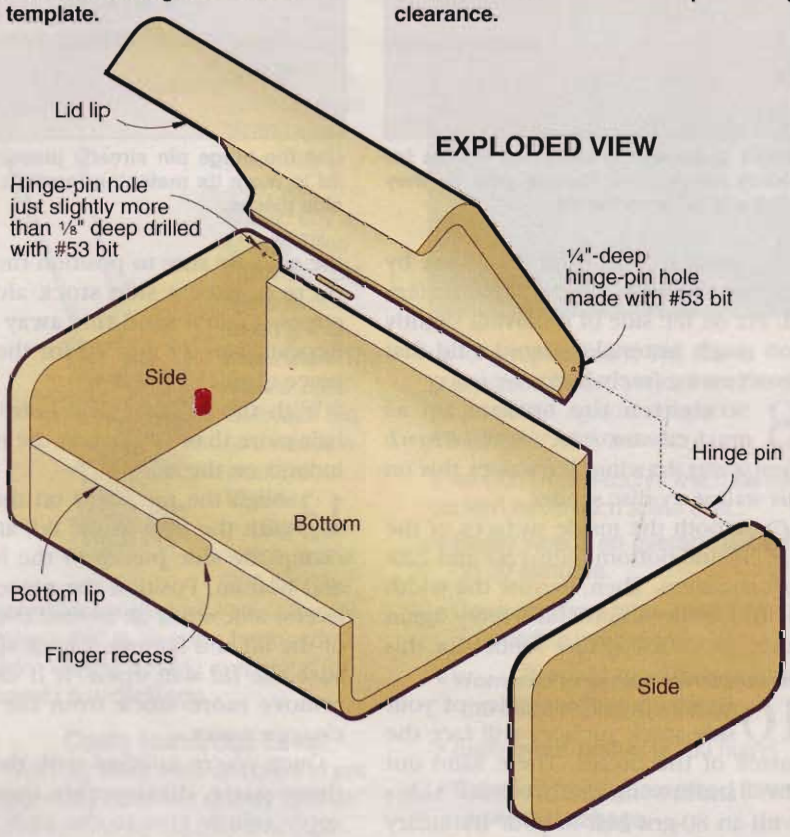


An awl or other sharp object serves as a pivot point for marking the lid clearance on the template.

Mark the template outline on the end of the block. Also mark the lid lip and hinge clearance.



Hold the block firmly on the table with one hand and use a pushstick to guide the portion of the block near the blade.



A sanding spindle with an aggressive abrasive, such as 50-grit, quickly smoothes out the bandsaw blade marks.

Use a #53 bit to drill the hinge-pivot holes into both ends of the box blank. Stabilize the bit with stop collars.

use the templates to mark the bandsaw cuts onto one end of the block.

Note that Jerry allows about 3/32" of space between each template for a bandsaw kerf and sanding. Cut the three templates to shape with a pair of scissors, but do not cut along the lid lip cuts or the cuts below the hinge pins. Mark the locations for the lid lips, lid clearance, and hinge pins on the card-stock templates.

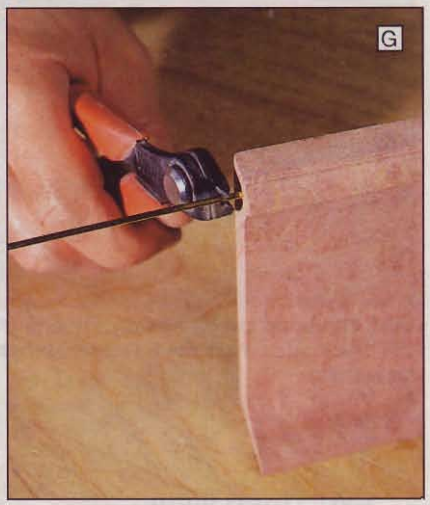
Note on the templates that we've determined how much stock you need to remove to allow the hinged lid to swing freely. Should you make a set of larger boxes, you can determine this clearance by using a pencil and awl as shown in *Photo A*. Just cut the template lid off, then pin the lid down with the awl at the hinge pin location. Pivot the lid, and follow it with a pencil to mark the needed clearance.

3 Place the largest template on the block, and trace its outline as shown in *Photo B*. Transfer the lid lip, lid clearance, and hinge pin locations onto the block of wood. Place the template on the opposite end of the block to mark the other hinge pin location.

4 To make the large blank, enter the cut through the lid lip, saw out the inner blank, and back out of the cut through the lid lip (see *Photo C*). Hold the block down firmly as you saw it to ensure 90° cuts.

Continued

Lightly touch one end of the lid to a disc sander to reduce its width by about 1/64" uniformly along the end.



Brass or bronze brazing rod makes for sturdy hinge pins. Nip the pins so they stick out 1/8" from the lid.

Use the hinge pin already placed in the lid to mark its matching location on the side pieces.

Set the inner block aside so you can use it later for creating the medium and small boxes. In the following steps we'll continue building the large box. Simply repeat all steps beginning with #3 to complete the medium and small boxes using the inner block. Remember to square the inner block on your disc sander before marking it for the medium blank. (If your bandsaw cuts are square you should have to do just light sanding.) Do the same before cutting out the small blank.

5 Smooth the inside of the box with a ¾" sanding spindle outfitted with 50-grit abrasive, as shown in *Photo D*. Jerry uses his drill press, but an oscillating spindle sander works well, too.

6 With a #53 bit, drill a ¼"-deep hole at both hinge pin locations in the lid, as shown in *Photo E*. Jerry uses four stop collars (two visible in the photo) to stabilize the bit and prevent it from bending or breaking. The collars also come in handy if your drill-press chuck won't go down to the small diameter of a #53 bit. Just be sure to mount the collars to the bit so the bit stays centered in the chuck.

7 Jerry uses a #53 bit because it's just slightly smaller than a 1/16" bit. That way, the 1/16" hinge pin has enough friction to hold the lip up and prevent it from slamming down due to looseness.

Separate the lid from the blank by cutting away the lid-clearance material. Err on the side of removing slightly too much material to avoid a lid that won't swing freely later.

8 Straighten the bottom lip as marked on the *Box Blank Templates* drawing. Jerry does this on his stationary disc sander.

9 Smooth the inside surfaces of the lid and bottom with 120- and 220-grit abrasives. Then, narrow the width of the lid by about 1/64". Jerry again turns to his trusty disc sander for this task, as shown in *Photo F*.

10 Determine which sides of your side stock surfaces will face the inside of the boxes. Then, sand out the bandsaw marks on those sides with an 80-grit belt in your stationary sander. Smooth these surfaces further with a hardwood sanding block and 120- and 220-grit abrasives. Be careful to keep the sanded surfaces flat.

11 Insert a length of 1/16" bronze or brass brazing rod into a hinge pin hole and nip it off so 1/8" of the rod protrudes, as shown in *Photo G*. Repeat for the other hinge pin.

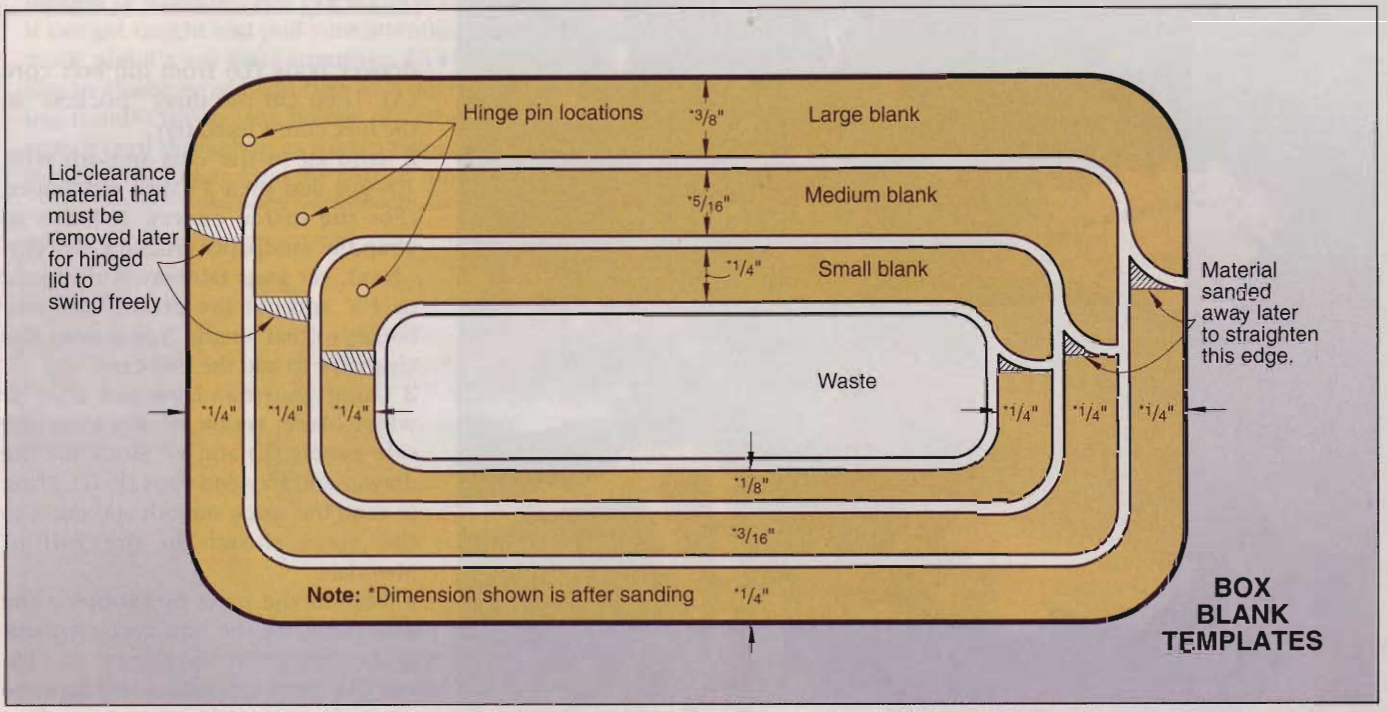
12 Cut two pieces of side stock to 3⅛×5⅛". Place one piece flat on a bench, inside surface up, and position the lid, as shown in *Photo H*. Mark the position of the hinge pin on the side stock by pressing the pin into the side. Be sure to position the lid so there is excess side stock along its edges. (You'll sand this away later.) Repeat *Steps 11* and *12* for the other piece of side stock.

With the #53 bit, drill holes just a hair more than 1/8" deep at the marked indents on the sides.

13 Align the pin holes on the sides with the pins in the lid, and dry-clamp the side pieces to the box lid and bottom. Position the pieces with excess side stock all around the edges of the lid and bottom. Check to make sure the lid will open. If it doesn't, remove more stock from the hinge clearance area.

Once you're satisfied with the fit of these parts, disassemble them and apply yellow glue to the ends of the box bottom, as shown in *Photo I*. Repeat for the other side and reclamp the assembly. Check the gaps at the hinge and lid lip; you usually can equalize small gaps by shifting the clamps slightly.

14 Allow the glue to dry, and remove squeeze-out with a sharp chisel. With a disc sander and 80-grit abrasive, sand the bottom, back, and front surfaces of the box, in that order, to bring the sides flush with those surfaces. Use a light touch and don't overheat the wood—that could cause it to warp. Next, equalize



the gaps on both ends of the lid with a light sanding, as shown in *Photo J*. Then, sand the top of the box. Go back to the disc sander and round over the four long edges of the box.

15 Remove all sanding marks on the outside of the box with a 150-grit belt in a stationary sander. Then, hand-sand the outside with 220-grit abrasive, and sand the entire box with 400-grit paper.

Make a centered mark on the bottom lip. Mark ½" on both sides of the center, and use a drum sander to cut a shallow finger recess, as shown in *Photo K*.

Blow, vacuum, or brush all dust from the box, and apply the finish of your choice. Jerry wipes on his own polyurethane/tung oil mix, but you can achieve similar results by applying an oil/varnish blend, such as Antique Oil Finish from Minwax or Olympic. After the finish dries, Jerry uses a bench grinder and buffing wheels to buff the outside with tripoli compound, and polish the surfaces with carnuba wax.

Written by Bill Krier with Jerry Patrasso and Jim Downing
Illustrations: Kim Downing; Lorna Johnson
Photographs: Tim Murphy/Foto Imagery; Marty Baldwin

Prevent squeezeout on the inside of the box by wiping the glue bead away from the inside edges of the lid and bottom.

Use a gentle touch with a disc sander to equalize the gaps between the box lid and sides.

Use a spindle sander to make a 1"-long finger recess along the bottom front edge of the box.

A Keepsake
Elegant results from

Watches, rings, and other precious things deserve a home that matches their good looks. You can provide one in this handsome hardwood keepsake box. It's compact, but a pair of trays and a drawer provide plenty of room to organize jewelry and other valuables. Best of all, the simple techniques and epoxied joints make it easy to build.

Glue up a building block

Note: *Unlike the burls often used as raw materials for bandsawn boxes, the block for this project has to be glued up from milled stock—a board at least 1½×6×26". You'll also need to resaw and plane a board into ¼"-thick and ⅜"-thick material for the drawer end caps and box side panels (Exploded View). For this project we recommend a stable hardwood, such as walnut, cherry, or mahogany. Tropical woods are another option. (See our Buying Guide on* opposite page.*)*

1 Glue up four pieces of 1½"-thick stock for the center block. The finished block should measure 5¾" high by 5⅛" wide by 5⅛" long. With a bandsaw and a stationary disc sander, you can trim an oversize block to the required dimensions and true up all the faces. Or mill each of the four layers exactly to size, and use clamping cauls to keep all the edges and faces properly aligned while the glue dries.

2 After you clean off any glue squeeze-out and sand the block smooth, use spray adhesive to affix a copy of the Core Side View pattern from the *WOOD PATTERNS®* insert onto one end of the block.

Cutting the basic box parts

Note: *For best results, install a new ⅛" blade on your bandsaw and tune the table so it's dead square to the blade. Any error will produce a box that doesn't fit together cleanly.*

1 Following the pattern's outlines and easing through the corners, bandsaw the lid (B), the tray body (C), and the drawer body (D) from the box core (A). Then cut the three "pockets" in the box core's fixed tray.

2 Sand all of the cuts smooth with 100-grit and then 150-grit sandpaper. (For the inside curves, it helps to wrap the sandpaper around a dowel.)

Next, set your tablesaw's rip fence to 4⅛" and cut the drawer and tray bodies to that length. You'll need this clearance to add the end caps.

3 Using your bandsaw and a ¼" or wider blade, resaw ⅜" stock for the side panels (E) and ¼" stock for the drawer and tray end caps (F, G). Plane or sand the stock smooth and cut it to the sizes shown in the Bill of Materials.

4 Test-fit the parts by clamping the side panels to the box core (without glue); then insert the drawer and lift-out tray parts (including end caps) to see if they fit with the correct clearance. Recut the center portion of either assembly if it proves too long.

5 Once everything fits properly, you're ready to glue up the box. (We used epoxy to bond the parts together because it dries clear, and its bead is thick enough to form a small fillet where the end caps and side panels meet their respective center parts. When finish is applied, the exposed adhesive becomes nearly invisible.

Place one side panel (E) on waxed paper (outside face down). Use a cotton swab or other small applicator to spread a uniform layer of epoxy on one end of the box core (A), then carefully place it on the side panel. No clamps are required, but allow the epoxy to set up before handling the assembly or gluing on the other side panel. Repeat this procedure for the tray and the drawer.

After the epoxy in all the joints has cured (which will vary according to the resin type and the ambient temperature), sand off any residue from the outside surfaces.

Box Worth Keeping

a simple bandsaw technique

Fit the lid and the hinge pins

1 Cut or sand about 1/32" from the length of the lid to provide clearance for it to open and close without binding. When you've got a good fit, use a cardboard spacer (the back of a note pad works great) as a shim between the back edge of the lid and the upper edge of the box core, then tape the lid in place with masking tape.

2 Make layout marks at the rear corners of the box, where the hinge pins will go (Hinge Pin Detail). With the lid taped in place, drill a 1/8" hole 3/4" deep through each side panel, into the ends of the lid, as shown in *Illustration A*.

3 Cut two 1½"-long pins from a length of 1/8"-diameter round brass rod; lightly chamfer the leading end on each. Now tap them into the holes you drilled. Make sure the lid opens and closes properly. If you need to adjust it or trim more length, pull the hinge pins and remove the lid. After you get a good fit, reinstall the pins and trim them off with a hacksaw; then sand them flush with the side panels.

One last detail—then finish

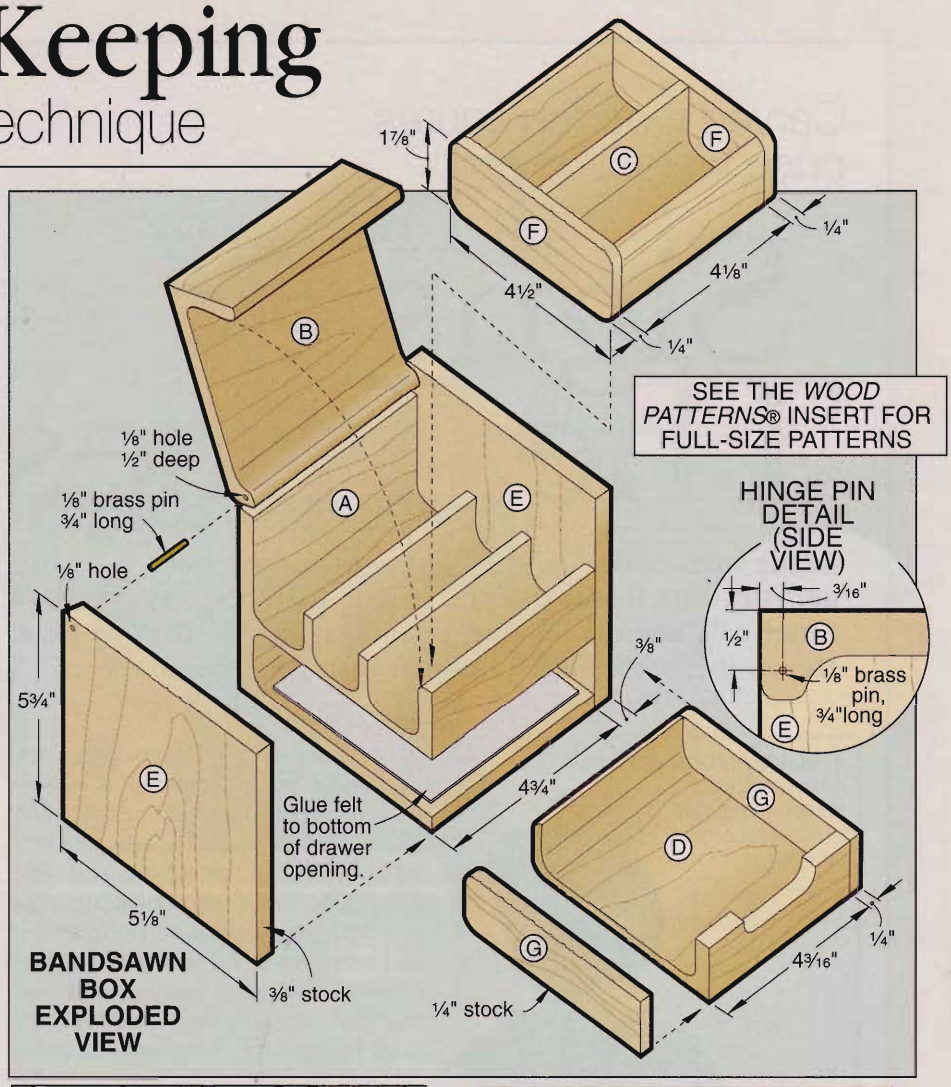
1 To keep the outside lines of the box clean, we opted for a drawer pull cutout rather than a knob. First, install a 3/4" straight bit in your router table; then clamp stopblocks to the fence to control the drawer's travel from side to side, as shown in *Illustration B*.

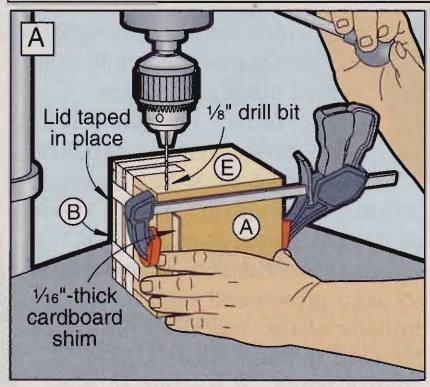
Make a test cut on a scrap block the same size as the drawer front, and limit the cut depth to about 1/8". When the setup is right, make a first pass in the drawer. Raise the bit again in 1/8" increments for another two passes or until the cutout is routed clear through the drawer front.

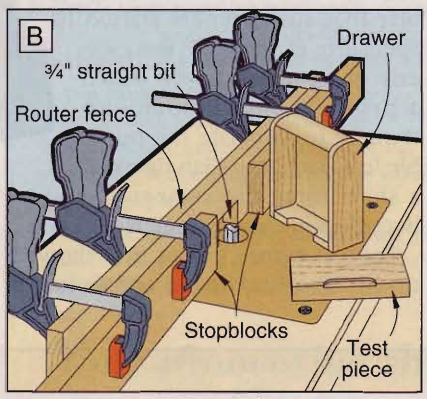
2 Apply several coats of a penetrating oil finish. (We used Minwax Antique Oil.) Line the drawer opening with felt if you want; then you can find some small treasures to take up residence in your new creation.

Written by Bill LaHay
Photography: John Hetherington
Illustrations: Roxanne LeMoine; Lorna Johnson

http://www.woodmagazine.com







Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
A box core*	5⅛"	5⅛""	4¾"	**	1
B lid*	1⅞"	5⅛"	4¾"	**	1
C tray body*	1⅞"	4⅜"	4⅛"	**	1
D drawer body*	1⁹⁄₁₆"	4⅞"	4³⁄₁₆"	**	1
E side panels	⅜"	5⅛"	5¾"	**	2
F tray end caps	¼"	1⅞"	4½"	**	2
G drawer end caps	¼"	1⁹⁄₁₆"	4⅞"	**	2

* Note: These parts feature irregular shapes due to the nature of the project design and technique. The dimensions shown reflect the overall space they occupy, but not the specific contours. See the *WOOD PATTERNS®* insert for details.
**Materials Key: See introductory note, page 74.

Buying Guide: For tropical species for this project you can order blanks (surfaced two sides and sized at 1½×6×26") in African padauk, black limba, bubinga, lacewood, sapele (quarter-sawn), or shedua for $35 each or three for $95, including shipping in the continental United States. Contact Woodworkers Source, 5402 South 40th St., Phoenix, AZ 85040, 800/423-2450.

Carved wooden figures once were...

The Signs of The Times

At the turn of the century, there may have been as many as 100,000 hand-carved shop figures advertising America's businesses and products. Today, they're rare. Here's their story and a look at some classic survivors.

A. BLACKAMOOR WITH KEG
Artist unknown.
Probably England;
c. mid-18th century.
20½" high.

In the days before every American citizen was guaranteed an education, many people could neither read nor write. So to sell goods and services back then, merchants and professionals put carved displays and symbolic signs outside their shops and workplaces to denote what they offered. The most famous of these was the "shop figure," as collectors call them. And the most recognizable of shop figures to us is the cigar-store Indian, although the carved figures frequently represented other personages.

The Indian became such a well-known symbol primarily because of Sir Walter Raleigh's efforts, although he wasn't aware of it at the time. It seems that the English nobleman introduced tobacco grown and smoked by the Indians of the Virginia Colony to England in the 1600s. Known as "Indian weed," it became so popular that storekeepers started to specialize in selling it. But cleverly promoting tobacco posed a problem—until someone thought to associate the puffable leaf with an Indian figure. In a short time, the cigar-store Indian became a marketing hallmark.

The cigar-store Indian first showed up in America during the Colonial

B. MALTZBERGER INDIAN
Artist unknown.
Probably New York City;
c. 1845. 44" high.

Period, but by the mid-1800s they proliferated. Every tobacco store had a carved Indian image—or something related—to help sell its goods. The carved figures were used for other purposes, too. They marketed liquors; pharmaceuticals; clothing; tea; and services, such as banking and insurance.

According to experts at the Museum of American Folk Art in New York City, carved shop figures reached their peak in the U.S. between 1840 and 1890. As one reporter wrote back then, "Few objects—policemen and lampposts excepted—are more familiar to the general public than the cigar-store wooden Indian." By 1900, though, the production of such figures literally had ceased because they had been replaced by metal signs and other forms of advertising.

Shaping the image business

As with the making of classic American furniture, shop figure carving had its origin in Europe. Art historian Ralph Sessions, who curated a shop-figure exhibit at the Museum of American Folk Art in 1998, believes the earliest known tobacconist figure showed up in an English shop in 1617. It was countertop size, and depicted an African-appearing person in a feathered kilt holding rolled tobacco leaves under his arm. Figures such as that remained popular in England for 200 years, but were joined by other human types, all mostly executed in quarter- or half-size.

In Europe, and later in America, carvers of shop figures were trained in traditional techniques that were applied to maritime carvings. Indeed, most American shop-figure carvers were well skilled at ship's figureheads. So from their shops in Eastern port cities—and to some extent along the Great Lakes—they turned out tens of thousands of promotional carvings. The carvers themselves coined the catch phrase "the image business" to characterize the wide range of figures they were asked to create.

C. VOLUNTEER FIREFIGHTER
Columbian Engine Co. 14.
Incised "S.A. Robb, 195 Canal St. New York City; 1876-1888." 29" high.

D. GIRL OF THE PERIOD
Artist unknown. New York City; c. 1870. 68" high.

It wasn't until the late 18th century, however, that life-size figures began to appear. Historical accounts cite Philadelphia sculptor and ship carver William Rush as the man who changed the course of shop figures to this larger scale after he spotted full-size figureheads on two French ships in port for repair. The larger-scale carvings were called "show" figures, and by the 1850s they were produced in remarkable variety. While the cigar-store Indian was the most prominent, show figures represented sports personalities, politicians, entertainers,

Continued

A heritage of carved signage

A. Blackamoor with keg
This inventive African figure represents the oldest form of English tobacconist figures. In England, the black man image was associated with exotic, far away lands. Virginia, the source of tobacco, was thought to be such a place, which explains the association. At the time, little was known of what American Indians looked like. In the collection of the Museum of American Folk Art.

B. Maltzberger Indian
After opening his tobacco shop in Reading, Pennsylvania, in 1847, John Maltzberger purchased this figure. It stood in front of the Maltzberger Cigar Store until 1928. Its pose is representative of the style carvers used for ship figureheads. The figure is in the collection of the Historical Society of Berks County, Reading, Pennsylvania.

C. Volunteer Firefighter
Firemen's courageous actions were widely acclaimed. This is thought to be a heroic commemorative figure carved after the engine company had long been disbanded, as indicated by the 1860-style uniform, and replaced by professionals. Owned by the New York City Fire Museum.

D. Girl of the Period
This figure caricaturizes the fashion-conscious young women of the time in urban America. It was found in Calais, Maine, and belongs to the New York State Historical Association, Cooperstown, New York.

E. Turk (see next page)
Figures of this type could be used in a variety of circumstances, depending on the proprietor's needs. This figure, found in Camden, Delaware, may have been used by a tobacconist, although it doesn't have identifiable accessories to associate it with tobacco. Turkish figures were associated with tobacco from Turkey, especially in Great Britain. In the collection of the Museum of American Folk Art.

F. Father Time (see next page)
Father Time is a stylized figure that might have been used in a shop as a type of doorbell. His left arm once could move so that the sickle hit the suspended bell. In the collection of the Museum of American Folk Art.

The Signs of the Times

TURK
Artist unknown.
Probably New York City or Philadelphia;
c. 1875. 77" high.

fictional characters, and such heroes as George Washington and Buffalo Bill Cody.

Ship carvers, bound by family and apprenticeships, were close knit. But they moved a lot, leaving partnerships and closing shops to seek business opportunity. Yet, they often followed styles developed by master carvers, who frequently reflected changes in the other decorative arts as well as printing and publishing. That's why today it's easier to surmise when a figure was carved than who created it.

Carving comes to an end

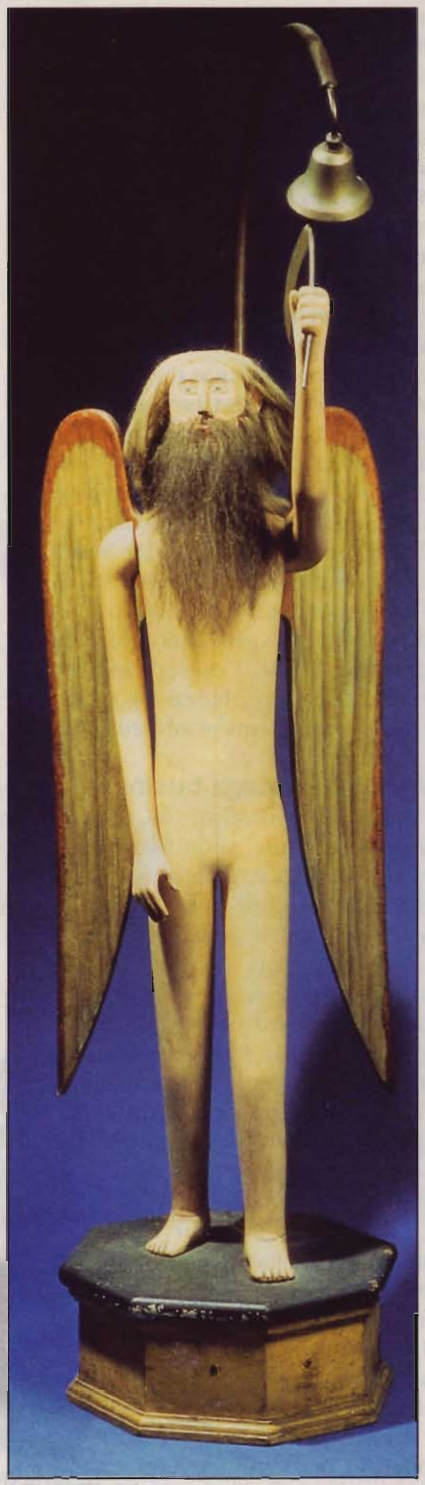
A large carving shop that produced shop figures or ship carvings might have two master carvers, some apprentices, and one or two traveling journeymen carvers, depending on the number of orders to be filled. Some carvers worked alone.

Eastern white pine was generally the material of choice for carvers of shop figures. In port cities, it could be bought in 3'- to 7'-long ship-mast sections at spar yards. Inland to the Midwest, it also was readily available from logging companies and other wood sources.

A shop figure, especially a highly popular model, would begin with a pattern. Other times, just the carver's eye would determine where the contour lines were drawn on the wood. Rough shaping was done with axes and adzes. Mallets and chisels created the details. The final figure was generally painted brightly and gilded.

Although other forms of advertising had replaced and outperformed the carved shop figure by the beginning of the 20th century, the traditional ship carvers who created them had by then become craftsmen of the past anyway. Their trade had been sunk years earlier by the development of the metal-hulled ship.

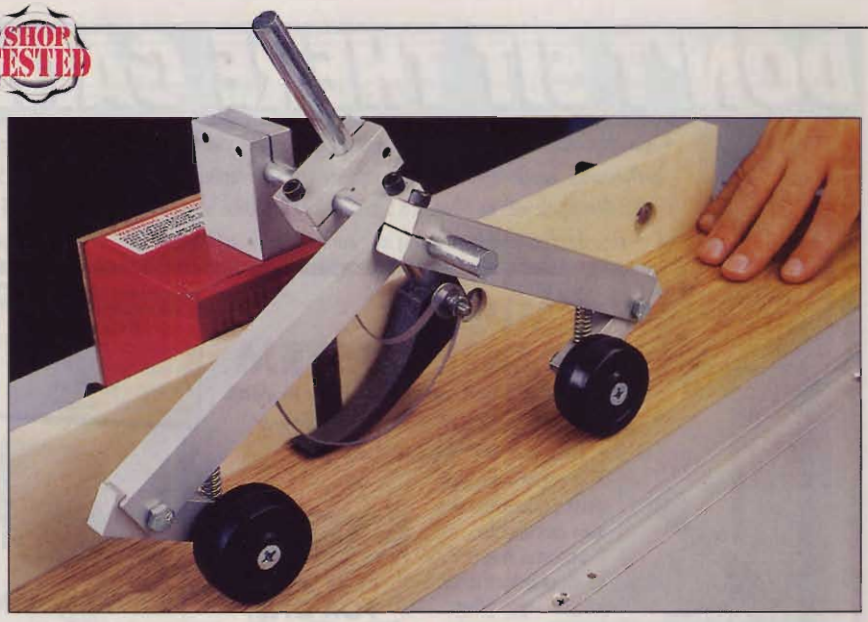
This article was drawn from historical material provided by the Museum of American Folk Art, Two Lincoln Square, New York, NY 10023-6214 (www.folkartmuseum.org).



FATHER TIME.
Artist unknown.
Mohawk Valley, New York;
c. 1910. Wood, metal, hair. 52" high.

Written by Peter J. Stephano
Photographs: Courtesy of the Museum of American Folk Art, New York City

One-handed table-routing with a two-wheel fence



Feather boards on a router table are great for keeping your work snug against the fence and tabletop, especially when all of the pieces are fairly narrow and the same width. But wide or varying-width workpieces can be a major headache: Either you can't use the feather board at all, or you have to readjust it for every piece.

To ease your stock-holding woes, the folks at Rousseau came up with the Deluxe Router Fence, which mounts easily even to shop-built router tables. Instead of flexible feathers, this dandy accessory uses a pair of rubber wheels toed 5° toward the fence. These rubber wheels force a workpiece solidly against the fence, while their stiffly spring-loaded arms keep the stock dead flat on the table. You only need to provide the feeding action.

Besides the wheels, the Deluxe Router Fence also incorporates a granny-shoe shaped hold-down (with a clear acrylic bit guard). You position it directly over the router bit to reduce bit chatter. It also offers downward pressure—but no lateral pressure—when working on pieces too narrow to use the wheels. Therein lies my one minor criticism of the Deluxe Router Fence. The wheels make effective contact only on stock that's wider than 2".

—Tested by Dave Henderson

PRODUCT SCORECARD

Rousseau RM3301DL Deluxe Router Fence

Performance	★ ★ ★ ★ ☆
Price	$139
Value	★ ★ ★ ★ ☆

For a Rousseau dealer near you, call 800/635-3416.

Locking tape doubles as a quick-change artist

It's Christmas Eve. You're rushing to finish up building that last gift, and as your retracting tape snaps back into its case, you hear the sickening sound of the broken blade spinning inside. Now what? Well, if you have a Craftsman E-Z Change locking tape, you simply reach into the drawer for a replacement blade, and five minutes later, you're back in business.

Truly, this is the only tape I've seen that changes out that quickly. The bottom of the case slides open so that you can remove the old blade without tearing the case apart. Then the new blade hooks onto a tail of blade attached to the hub. In fact, if you're just replacing a worn blade, you don't need to open the case at all: Just pull the blade all the way out, slip a nail into the tail, hook the new blade on as shown at *left*, and remove the nail.

The tricky part about replacing any broken blade is in resetting the spring tension, and it's here that the E-Z Change really shines. Using the tool's external ratcheting mechanism I easily wound the spring to its proper tension. Actually, I purposely overtightened the spring, but, by pushing in the winding tab, readjusted the tension until it was perfect.

Besides the 25' tape I tested, the E-Z Change comes in 12', 20', and 30' lengths. A replacement blade runs about $4, and it's worth it to have one on hand for emergencies. And with Craftsman's lifetime warranty, you can simply take the broken blade back to Sears at your convenience for a free replacement.

—Tested by Bob McFarlin

PRODUCT SCORECARD

Craftsman E-Z Change Locking Tape

Performance	★ ★ ★ ★ ★
Price	25', $14; 30', $16
Value	★ ★ ★ ★ ☆

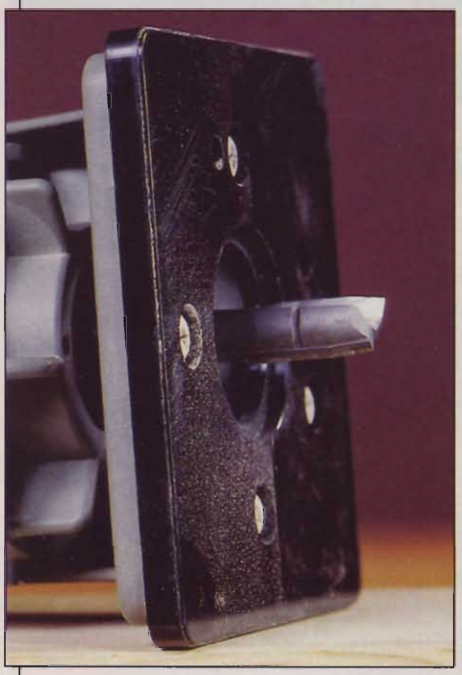
For more information, call 800/377-7414, or visit the Craftsman tools website at www.sears.com/craftsman.

Continued on page 82

Continued from page 80

Roll out the barrel-shaped Ply Prep bit before banding

Because of its dimensional stability, many woodworkers prefer hardwood-veneer plywood for cabinet work. But the ugly, layered edges of plywood detract from the beauty of the project unless they're capped with a strip of solid-stock edging. It is for this process that the Ply Prep router bit was created.



The theory behind the Ply Prep bit (it looks like a slightly chubby straight bit) is that plywood's inner plys expand when you apply glue, pushing the edging away. Chuck the bit into your router, center the bit's mark on your plywood, and—using a straightedge guide—rout the edges. The bit cuts a shallow cove in the edges of the workpiece, slightly relieving those inner plys, giving them room to expand, and preventing a bulge.

After milling the edges of some plywood shelves with the Ply Prep bit, I noticed that my solid-stock edging joints came together tighter than before, with virtually no clamping pressure. In fact, I found I could hold the stock in place with just a few pieces of masking tape along the edge. And, with no clamping, there was no glue squeeze-out. As a bonus, the bit left me with chip-free edges on my plywood.

The Ply Prep router bit removes some of the plywood's face and back when it does its thing, so you need to cut your pieces slightly oversized. For the same reason, I found it difficult to use in a router table, unless you can slightly offset the outfeed fence of your router table (like the table of a jointer).

—Tested by Bob McFarlin

PRODUCT SCORECARD

Ply Prep router bit

Performance	★ ★ ★ ★ ☆
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Value	★ ★ ★ ★ ☆

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14" x 80 T (1" hole)	~~197~~	177	158
14" x 100 T (1" hole)	~~226~~	203	181
16" x 100 T (1" hole)	~~245~~	219	194

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14" x 40 T x 1"	~~$148~~	$134	$119
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12" x 40 T x 1"	~~128~~	116	103
12" x 30 T x 1"	~~118~~	107	95
10" x 40 T x ⅞" or 1/32"	~~118~~	107	95
10" x 30 T x ⅞" or 1/32"	~~98~~	89	79
9" x 40 T	~~108~~	98	87
9" x 30 T	~~98~~	89	79
*8¼" x 40 T x 3/32"	~~98~~	89	79
8" x 40 T x 3/32"	~~98~~	89	79
8" x 30 T x 3/32"	~~88~~	80	71
7¼" x 30 T x 3/32"	~~68~~	62	55
**6" x 40 T x 3/32"	~~88~~	80	71
***5⅜" x 40 T x 10mm	~~88~~	80	71

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8½" x 60 T Hitachi, Dewalt, Ryobi, FreudTR125	~~116~~	107	95
9" x 80 T Delta & Others	~~128~~	116	103
10" x 80 T Delta, Bosch, Mitachi, Makita, Ryobi, AEG, & All	~~138~~	125	111
12" x 80 T Dewalt, Hitachi, Makita, Ryobi, Sears, & All	~~149~~	134	119
14" x 100 T Makita, Ryobi	~~189~~	170	151
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Designed for radial arm or tablesaws—fine crosscut.

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8", 8¼", 7¼" x 60T	~~$109~~	$98	$87
10" x 60 T (⅝" hole)	~~129~~	116	103
12" x 60 T (⅝" or 1")	~~139~~	125	111

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Make interchangeable dovetails? You can with this jig

When I first laid eyes on the Universal Jointer dovetail jig, I was impressed with the way it provided full-support for a router base. Now that I've had my hands on it as well, I'm also amazed at the repeatable accuracy with which it makes joints, including box joints, rabbets, tenons, and sliding (but not half-blind) dovetails.

Most through-dovetailing jigs require two routers (one to cut pins, and the other to cut tails) because you mount both workpieces in the jig at the same time. With the Universal Jointer, you can cut all the pins on a kitchen full of drawers, change bits, then cut all the tails. And when you're done, any two pieces will fit together perfectly.

PRODUCT SCORECARD

Universal Jointer

Performance	★ ★ ★ ★ ☆
Price	$239
Value	★ ★ ★ ★ ☆

For a dealer near you, call Universal Fixtures at 724/733-8644.

How can the Universal Jointer make dovetail joints so interchangeable? First, instead of a series of moveable forks, this jig uses a pair of precision-cut, phenolic-coated, marine-plywood templates to pilot your router through the cuts. Because the openings on the templates never change, every pin and every tail comes out identical.

Secondly, the Universal Jointer sports a stepped aluminum pin and a series of registration holes that positively locate each workpiece. When used with the eccentric spacing block, I could move the jig in precise ⅛" increments. Using the templates and locating pin, I bet you could cut dovetail pins all day, disassemble the jig, come back a year from now, and cut perfectly mating tails.

To make spacing almost foolproof, much of the extensive instruction manual is devoted to charts showing which combination of templates, bits, registration holes, and pins result in different joint patterns. Unfortunately, it doesn't devote much space to centering the pattern on different widths of stock, so I ended up centering by trial-and-error. One other minor criticism: The Universal Jointer requires 14° dovetail bits, which make for strong joints, but I had trouble finding and buying some of the sizes specified in the charts (such as ⅝", ⅞", and 1").

Finally, unlike other jigs, the jig clamps to your workpiece, and the workpiece to your bench. So, you can join stock longer than your bench's height, even if you need a ladder to do it. The Universal Jig can handle workpieces up to 18" wide.

—Tested by Dave Henderson

Continued on page 85

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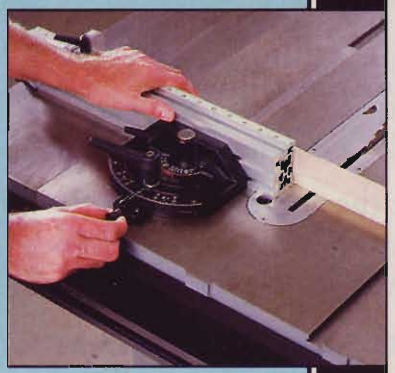

We do not recommend operating without the saw blade guard, as is shown here.
US Patent #5,038,486

Optional accessories: manual clamp– pneumatic clamp– 3/8" x 3/4" miter bar–

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SHOP TESTED

Continued from page 82

"Photocopy" a pattern onto your workpiece

When I need to copy a full-size pattern onto a workpiece, I place a photocopy face down on the piece and warm it with a clothes iron. The heat reactivates the toner and transfers the pattern to the wood. However, the iron's large surface doesn't let me be selective about which lines I transfer, and it's easy to scorch my pattern. The Transfer Tool nicely addresses both problems.

With its ¾"-diameter tip, I got into tiny areas and copied small line drawings and photos without burning my fingertips. And, because the Transfer Tool is designed specifically for this purpose, the temperature setting is as low as it can be for effective transfer without burning the pattern. In fact, I found the going a little slow for my taste and would probably go back to my old iron for larger patterns.

One caveat: The process leaves you with a mirror image of the original pattern, which can be a problem, especially if there are letters in it. To get around this, take the extra step of making the first photocopy on transparency film (available at office supply stores), then photocopying the transparency from the back.

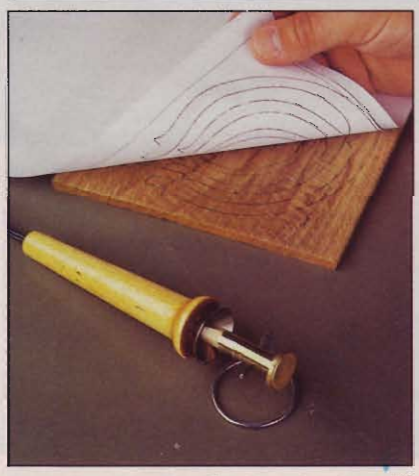
—Tested by Dave Henderson

PRODUCT SCORECARD

Wall Lenk Transfer Tool L16TT

Performance	★ ★ ★ ★ ☆
Price	$21
Value	★ ★ ★ ★ ★

To locate a dealer near you, call toll-free 888/527-4186.



Continued on page 86

YEAR 2000

It's About Time

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1. No purchase necessary to enter or win.
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3. Entries must be received by April 3, 2000. All entries must be postpaid; collect entries will be refused. Attach a 3-1/2"X5" card with your name and address to each entry. You may submit up to 3 entries. Winners limited to one prize. Send all entries to: "It's About Time" Clock Contest, 1716 Locust Street (GA 310), Des Moines, IA 50309-3023.
4. Entries become property of WOOD Magazine and will not be returned. All entries will be offered at auction under the supervision of Meredith Corporation; and all proceeds from the auction will be donated to the U.S. Marine Corps Reserve Toys for Tots program.
5. The entry must be your own original design and not made from previously published patterns. A different approach to an existing clock case could qualify.
6. The sponsors are not responsible for illegible, lost, late, misdirected, damaged, delayed or stolen entries. All decisions of the judges are final. Entry constitutes permission to use winner's name, hometown, and photograph for promotional purposes, unless prohibited by law. Employees and immediate family members of Meredith Corporation and Titebond® Glues & Adhesives and their affiliates and subsidiaries are ineligible. Open to U.S. and Canadian residents, except Quebec. Subject to all U.S. federal, state and local laws and regulations. Void where prohibited.
7. Winners will be selected and notified by mail on or about May 15, 2000. A panel of representatives from the U.S. Marine Corps Reserve, Meredith Corporation and woodworking experts will judge all entries on or about May 1, 2000 on design excellence, creativity and craftsmanship.
8. Grand Prize - $5,000; First Prize - $4,000; Second Prize - $3,000; Third Prize - $2,000; Fourth Prize - $1,000; 25 honorable mentions
9. Winners are responsible for applicable taxes. Winners will be required to complete an Affidavit of Eligibility, Ownership and Liability Release within 14 days of notification, or an alternate winner may be selected.
10. Winners will be published in the December 2000 issue of WOOD. For a list of winners, send a separate self-addressed stamped envelope after June 1, 2000 to: "It's About Time" Clock Contest, 1716 Locust Street (GA 310), Des Moines, IA 50309-3023.

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PRODUCTS THAT PERFORM SHOP TESTED

Continued from page 85

Accuracy of unique miter gauge trips our trigonometry

Although I was never a whiz at trigonometry (I always thought "cosine" was something you did to get a loan), I do know that mathematics can be a woodworker's best friend. The folks at Osborne Manufacturing figured a way to use higher math to take the tablesaw miter gauge to a new level of accuracy, and came up with the Osborne EB2 Miter Guide.

The first thing I noticed is the lack of a semi-circular protractor with tiny marks to show me the angle of my miter cut. Instead, an adjustable arm stretches between the guide bar and fence, as shown *below*. Numbers and graduations etched into the arm indicate the miter angle.

So, you ask, is it more accurate than a typical miter gauge? Absolutely. With the EB2, I simply loosened a knurled knob, slid the arm so the end of the tube lined up with the mark for my angle, and tightened the knob. The mitered corners on my 4-sided frame came out perfect. The distance between each degree on the arm varies from 1/16" to 1/8", so I found it easy to eyeball even fractions of degrees. Milled detents snap the arm in place at precisely 0°, 22½°, 30°, 45°, and 90°.

The 21"-long guide bar is the longest I've seen, and works in virtually any standard 3/8×3/4" guide slot. (Some slots are a hair undersized, and Osborne offers a slightly slimmer bar for those saws.) If your saw's slot is a little worn, expansion slots in the bar widen it for a snug fit. As a bonus, tapered setscrews let you adjust these expansion slots without removing the bar from the miter slot, saving a lot of test-fitting.

Another unique feature of the EB2 is its reversible 25½" extruded-aluminum fence. One face is covered with non-slip tape to keep your stock from creeping, while the other offers a smooth surface and measuring tape. The aluminum flip-stop works on either face.

Osborne Manufacturing president David Osborne told me that he's also working on a 26" telescoping stop that extends beyond the length of the fence. The extension stop should be available in mid-2000 and will fit all EB2 guides made after February 1, 1999.

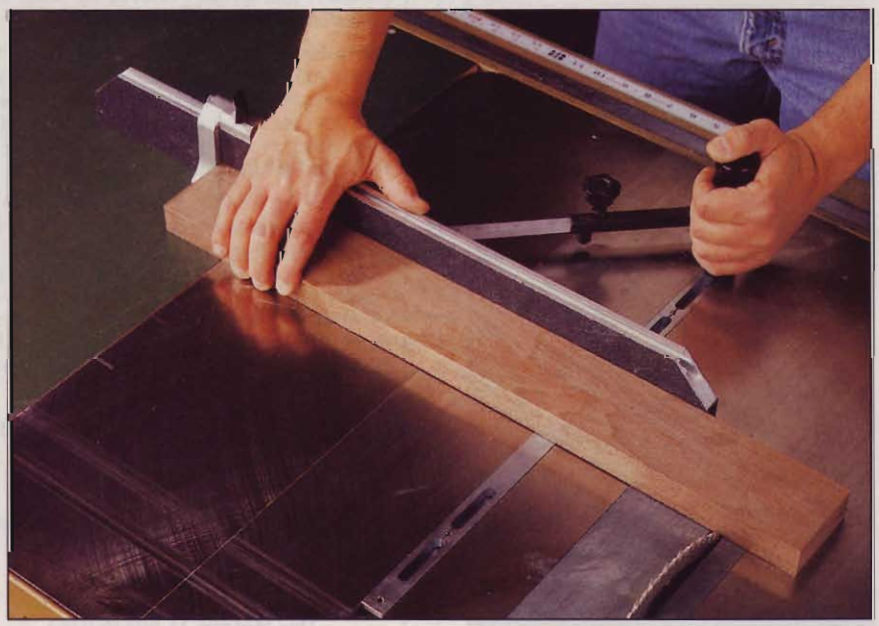
—Tested by Dave Henderson

PRODUCT SCORECARD

Osborne EB2 Miter Guide

Performance	★ ★ ★ ★ ★
Price	$160
Value	★ ★ ★ ★ ☆

Call Osborne Manufacturing Co. at 800/852-9655, or order online at www.osbornemfg.com.



Continued on page 98

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PRODUCTS THAT PERFORM — SHOP TESTED

Continued from page 86

Purge pesky labels and residue with Sticker Lifter

These days, you just can't escape stickers—a bar code label pasted on a hammer, a price tag stuck on a pair of shelf standards, even the hardwood you bought has its dimensions adhered to it on a label. If you can peel the label off without tearing it, you're often left with a gummy mess that can't be sanded away and draws dirt like a freshly bathed kid. Sticker Lifter may be the solution to this sticky problem.

I dripped a few drops of the citrusy-smelling solvent on the label on the piece of mahogany shown *below*, and let it soak for a few seconds. Then, using the plastic scraper that comes with the solution, I just peeled the label off. Sticker Lifter left the wood clean with no apparent residue to hinder the finish (although you should still sand prior to finishing).

Emboldened, I found myself wandering around the shop looking for other things to unstick—a UPS label here, a price tag there, even that spongy foam tape that sticks to everything. Some items needed to be soaked longer than others, but eventually, they all came clean.

—Tested by Chuck Hedlund

PRODUCT SCORECARD

Sticker Lifter

Performance	★ ★ ★ ★ ★
Price	$4 for 2 fl. oz.
Value	★ ★ ★ ★ ☆

For more information, call Magic American Corp. at 800/321-6330.

Continued on page 100

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PRODUCTS THAT PERFORM

SHOP TESTED

Continued from page 98

Bandsaw guide throws resawing a gentle curve

A wandering bandsaw blade has cost many a resawing woodworker time and precious stock, but what's a guy to do? Straight fences offer solid stock support, but don't let you pivot the workpiece to account for blade drift. On the other hand, bullnose guides allow too *much* control. The FastTrak Bandsaw Resaw Guide strikes a happy medium between both.

Like a bullnose guide, this anodized aluminum accessory provides a single pivot-point for steering stock through the blade. But, its broad curved face gave me better control than a narrow bullnose. I felt almost as if I could micro-adjust the cut, with a wide swing of the workpiece yielding only a small adjustment in the blade path.

The Resaw Guide's positioning also helped me stay on top of the curve. The manufacturer recommends setting the crown of the guide slightly ahead of the teeth, which struck me as odd. However, with the guide positioned in this manner, I found I could steer the board precisely *into* the cut, rather than *out* of it.

T-slots on the back of the Resaw Guide make mounting it to your bandsaw's rip fence almost as smooth as the wood you'll cut with it. The 7"-tall guide works on virtually any stationary bandsaw, but if you routinely resaw narrow stock, the 4½"-tall version keeps your bandsaw's blade guides closer to your workpiece.

—Tested by Dave Henderson

PRODUCT SCORECARD

FastTrak Bandsaw Resaw Guide

Performance	★ ★ ★ ★ ★
Price	$16, 4½" guide; $20, 7" guide
Value	★ ★ ★ ★ ★

For more information, call toll-free, 888/327-7725, or visit the FastTrak website at www.dwave.net/~fasttrak.

WOOD ANECDOTE

Black Willow

The tree that can't help but grow

From the Midwest and eastward, the black willow shows up everywhere. It grows as far north as New Brunswick and to Georgia in the south. On the sandy dunes of North Carolina's offshore islands, it's but a shrub. Travel westward, though, to the vast drainage of the Mississippi River, and the willow grows to commercial-lumber size.

In the Mississippi's rich bottomlands, the black willow attains great proportions—sometimes 100' tall with a trunk nearly 4' in diameter. That size suits the lumbermen just fine. They saw and dry the wood for manufacturing into boxes, crates, and even wooden shutters. In days gone by, some of the black willow harvest would have gone for artificial limbs because of its light weight, yet super shock absorbancy.

Today's country craftsmen turn to freshly cut willow shoots for woven baskets and larger branches and saplings for bark-on, wicker-like furniture. The green wood, collected in cool months, retains its skin-like bark seemingly forever after harvest.

Black willow's greatest contribution to man goes mostly unsung, however. On riverbanks, the deep-rooted, pliant tree buffers raging waters that would sweep away soil. In fact, engineers favor the black willow for planting as a levee reinforcement.

The black willow doesn't need man's help to propagate. Insects pollinate its catkins (blossoms). The wind spreads them. Twigs, snapped off by water, wind, man, or animal, find a resting place in the ground. Then, despite weeks of dormancy, they'll sprout and grow. Try it.

Illustration: Jim Stevenson

A twig from a black willow tree growing on a river bank may end up sprouting on a downstream sandbar.

When you buy a machine you also buy the company selling the machine. Torben Helshoj, President of Laguna Tools understands the American Woodworker, because he is one. Torben knows firsthand the hard work that goes into every piece of furniture. Having the best tools makes a difference.

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Circle No. 615

Another Asian insect attack

It's not the Asian longhorned beetle that's giving New Orleans fits. But the menace that's eating up the historic French Quarter and other sites did come from Asia. It's called the Formosan subterranean termite (*Coptotermes formosanus*), and it eats homes, buildings, live trees, as well as crops and plants. Here are just a few instances of damage:

- The gymnasium floor of a New Orleans Parish high school, built in 1996, was eaten away.
- Thirty percent of the city's live oak trees—some 300 years old—have been infested. (The termites also like ash and baldcypress.)
- A cannon outside the French Quarter's St. Louis Cathedral crashed to the ground after its wooden carriage became a meal.

The terrible termites came to the U.S. in crates holding leftover military equipment and supplies from Pacific fighting in World War II. They're larger, more aggressive, and there are more of them per colony than our native termites. They're also hungrier—a typical colony might eat 1,000 pounds of wood a year. (There's a colony in each of the French Quarter's 110 square blocks.)

Terrible termites attack New Orleans.

They became so well established because they actually weren't detected until 1965. And all truly effective pesticides have been banned from use since 1988.

Formosan termites now infest 14 states and cost about $1 billion annually in property damage, repairs, and control measures. The federal government has launched a new national campaign to control and eradicate them. For information, contact the Southern Regional Research Center, Agricultural Research Service, L.S.U. Agricultural Center, New Orleans, LA 70179. Call 504/286-4444 or visit www.ars.usda.gov.

Some redwood now sheds water

Nature endowed redwood with decay and insect resistance. Water is its only enemy, so structures like redwood decks must be protected with two coats of a waterproofer. The Thompson's Company of Dallas, though, wants to eliminate those preliminary steps for the homeowner with a new product—pressure-treated and waterproofed redwood lumber.

Thompsanized Redwood lumber has the appearance and durability of premium construction heart redwood. Pressure treating with an organic preservative enhances the wood's rot resistance. The toned waterproofing stain applied at the plant evens the color. To treat the cut ends created in construction, the company sells a Cut End stain. While the factory coating initially saves homeowners time and effort, Thompsanized Redwood does have to be rewaterproofed annually.

The price of the treated and waterproofed redwood lumber runs about 12 percent more than construction common redwood. Thompson's also markets pressure-treated pine that's waterproofed, called Thompsonized Lumber. For more information, phone 800/367-6297, or visit the web site, hickson.com/thompson.html.

It wasn't just junk

Tom Kelly, of Fort Collins, Colorado, exhibited vision, patience, and skill in turning a wood pile found at an estate sale into a striking piece of period furniture. His efforts also brought him $3,000 cash and a package of tools as the Grand Prize winner of Dremel's recent Furniture Refinishing Contest.

Tom's turn-of-the-century hall tree, shown in the photo *far right,* involved 85 hours of labor to arise from the pile of parts, *near right.* And because the contest rules required both a before and after photo, he spent time with photography, too. Now, with the new Dremel contour sander, Multipro rotary tool, a furniture refinishing kit, and the pocketful of cash he won, Tom can shop for more challenges.

This turn-of-the-century hall tree, *right,* took Fort Collins, Colorado's Tom Kelly 85 hours to rebuild and refinish from the pile of parts he started with, *above.*

Racine, Wisconsin-based Dremel offers tips on restoration projects and finishing to the general public, too. Just visit its web site with your questions at www.dremel.com, or call 800/437-3635.

Photographs: Courtesy of Dremel Illustration: Jim Stevenson